

Quaestiones Entomologicae

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SYSTEMATIC STUDIES ON PSEUDOMYRMECINE ANTS: REVISION OF THE *PSEUDOMYRMEX OCULATUS* AND *P. SUBTILISSIMUS* SPECIES GROUPS, WITH TAXONOMIC COMMENTS ON OTHER SPECIES

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ABSTRACT

The first part of this paper contains a synopsis of the major species groups and revisions of two such groups (*P. oculatus* group, *P. subtilissimus* group) in the large Neotropical ant genus *Pseudomyrmex*. Eleven species are recognized in the *P. oculatus* group, of which three are new: *P. alustratus* Ward (from Peru), *P. cretus* Ward (Costa Rica), and *P. pisinnus* Ward (Brazil). *P. caeciliae* (Forel) is raised to species (stat. nov.), and the following new synonymy is proposed: *P. elongatus* (Mayr) = *P. alliodorae* (Wheeler); *P. oculatus* (F. Smith) = *P. altinodus* (Mann) = *P. tuberculatus* (Enzmann) = *P. wessoni* (Enzmann); *P. urbanus* (F. Smith) = *P. chodati* (Forel) = *P. ogloblini* (Santschi). Four species are recognized in the *P. subtilissimus* group of which two are new: *P. spiculus* Ward (Costa Rica), and *P. villosus* Ward (Brazil). *P. culmicola* (Forel) is proposed as a junior synonym of *P. tenuissimus* (Emery). A final section of the paper contains taxonomic comments, including new synonymy and lectotype designations, on 22 other species of *Pseudomyrmex*, in various species groups, with emphasis on taxa which are associated with ant-plants. No new species are described but three taxa [*P. pazosi* (Santschi), *P. rufiventris* (Forel), and *P. tachigaliae* (Forel)] are raised to species (stat. nov.); two species [*P. dendroicus* (Forel), *P. osurus* (Forel)] are removed from synonymy (stat. reval.); a replacement name (*P. laevifrons* Ward, nom. nov.) is provided for *P. laeviceps* (F. Smith), 1877 (nec F. Smith, 1859); and 32 new synonymies are proposed. Identities of some of the *Pseudomyrmex* species inhabiting *Acacia*, *Tachigali*, and *Triplaris* are clarified.

RÉSUMÉ

La première partie de cet travail contient un sommaire des groupes principaux d'espèces et révisions de deux tels groupes (groupe *P. oculatus*, groupe *P. subtilissimus*) dans le grand genre Neotropical, *Pseudomyrmex*. Onze espèces sont reconnues dans le groupe *P. oculatus*, desquelles trois sont nouvelles: *P. alustratus* Ward (de Peru), *P. cretus* Ward (Costa Rica), et *P. pisinnus* Ward (Brazil). *P. caeciliae* (Forel) est élevé à l'étage d'espèce (stat. nov.) et le nouveau synonymie suivant est proposé: *P. elongatus* (Mayr) = *P. elongatus* (Wheeler); *P. oculatus* (F. Smith) = *P. altinodus* (Mann) = *P. tuberculatus* (Enzmann) = *P. wessoni* (Enzmann); *P. urbanus* (F. Smith) = *P. chodati* (Forel) = *P. ogloblini* (Santschi). Quatre espèces

sont reconnues dans le groupe *P. subtilissimus*, desquelles deux sont nouvelles: *P. spiculus* Ward (Costa Rica), et *P. villosus* Ward (Brazil). *P. culmicola* (Forel) est proposé comme un nouveau synonyme de *P. tenuissimus* (Emery). Une section finale contient notes taxonomiques, comprenant nouveau synonymie et désignation des lectotypes, sur 22 autres espèces de *Pseudomyrmex*, dans quelques groupes d'espèces, avec accent sur taxa qui sont associés avec des plantes myrmecophiles. On ne décrit pas nouvelles espèces, mais trois taxa [*P. pazosi* (Santschi), *P. rufiventris* (Forel), et *P. tachigaliae* (Forel)] sont élevés au niveau d'espèce (stat. nov.); deux espèces [*P. dendroicus* (Forel), *P. osurus* (Forel)] sont enlevés de synonymie (stat. reval.); un nom de remplacement (*P. laevifrons* Ward, nom. nov.) est fourni pour *P. laeviceps* (F. Smith), 1877 (nec F. Smith, 1859); et 32 nouveaux synonymes sont proposés. Les identités de quelques espèces de *Pseudomyrmex* qui vivent dans *Acacia*, *Tachigali* et *Triplaris* sont clarifiées.

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INTRODUCTION

The New World ant genus *Pseudomyrmex* contains a large number of species and is a conspicuous element of the Neotropical arboreal ant fauna. It is known from

southern United States (with northward extensions to about 40°N latitude on the east and west coasts) south to approximately 36°S in Chile and Argentina. A closely related Old World genus, *Tetraponera*, is distributed from Africa to southeastern Asia and Australia. Much taxonomic work remains to be done on these ants, both in terms of species diagnosis and phylogenetic evaluation. Within the genus *Pseudomyrmex* there are more than 250 available species-level names, of which about 70% are valid presently. Most of these names accumulated in a piece-meal fashion in the late nineteenth and early twentieth centuries, without the benefit of any synthetic, revisionary studies. As a first attempt to deal with the taxonomy of this genus, Kempf (1958, 1960, 1961, 1967) delineated five species groups, containing about half of the described taxa, and clarified the identities of some species within these groups. The Nearctic species of *Pseudomyrmex* were reviewed by Ward (1985), who recognized two additional species groups (*P. elongatus* group, *P. pallidus* group).

The present paper contains a reevaluation and synopsis of the major species groups, and revisions of two such groups: (i) the *P. oculatus* group, which is expanded to include the "*elongatus* group" of Ward (1985), and (ii) the *P. subtilissimus* group, here defined and diagnosed for the first time. A fourth section contains taxonomic comments about some of the remaining species of *Pseudomyrmex*. It is based on a study of type material in European and North American collections, and helps to provide a foundation for future revisionary work on the other major species groups. Such work, currently in progress, will include keys to species groups and to isolated species of uncertain placement, as well as phylogenetic assessments of the relationships among groups. A preliminary analysis of these relationships is presented in Ward (1990a). A generic revision of the subfamily Pseudomyrmecinae and a higher-level phylogenetic analysis appears in Ward (1990b).

The genus *Pseudomyrmex* is richly endowed with sympatric sibling species and taxonomically confusing "species complexes", a situation which is apparent even in the depauperate Nearctic fauna (Ward, 1985). The resolution of such taxonomic imbrolios requires careful analysis of character variation in large samples of diverse geographic origins. *Pseudomyrmex* workers do not exhibit striking interspecific variation in sculpture or spinescence; differences between closely related species often reside in subtle contrasts of size and shape. I have attempted to quantify these differences wherever practical and to avoid subjective qualitative statements. But quantitative assessments of size and shape often reveal an impressive amount of apparent intraspecific variation, making the search for diagnostic differences challenging. Needless to say, precise metric measurements are necessary for the accurate determination of many *Pseudomyrmex* species, and the taxa dealt with in this paper are no exception.

MATERIALS AND METHODS

Collections

Material was examined in the following collections (abbreviations follow those of Arnett & Samuelson (1986) as closely as possible):

- BMNH British Museum (Natural History), London, U.K.
- CASC California Academy of Sciences, San Francisco, CA, USA
- CDAE California Dept. of Food and Agriculture, Sacramento, CA, USA
- CELM Colección Entomología "Luis Maria Murillo", Instituto Colombiano Agropécuario, Bogotá, Colombia
- CISC California Insect Survey, University of California at Berkeley, CA, USA
- CKIC C. Kugler Collection, Radford University, VA, USA
- CNCC Canadian National Collection of Insects, Biosystematics Research Institute, Ottawa, Canada
- CUIC Cornell University Insect Collection, Ithaca, NY, USA
- EBCC Estación de Biología Chamela, Jalisco, Mexico
- FFIC Fernando Fernández Collection, Bogotá, Colombia
- GBFM Graham B. Fairchild Museo de Invertebrados, Universidad de Panama, Panama
- GCWC G. C. & J. Wheeler Collection, Silver Springs, FL, USA
- GHPC G. H. Perrault Collection, Paris, France
- ICCM Carnegie Museum of Natural History, Pittsburg, PA, USA
- IEGG Istituto di Entomologia "Guido Grandi", Università di Bologna, Italy
- INHS Illinois Natural History Survey Insect Collection, Champaign, IL, USA
- INPA Instituto Nacional de Pesquisas da Amazonia, Manaus, Brazil
- IZAV Instituto de Zoología Agrícola Universidad Central de Venezuela, Maracay, Venezuela.
- JTLC J. T. Longino Collection, University of California at Santa Barbara, CA, USA
- KSUC Kansas State University Insect Collection, Manhattan, KS, USA
- KWJC K. W. Jaffé Collection, Universidad Simon Bolívar, Caracas, Venezuela
- LACM Los Angeles County Museum of Natural History, Los Angeles, CA, USA
- MCSN Museo Civico di Storia Naturale, Genoa, Italy
- MCZC Museum of Comparative Zoology, Harvard University, Cambridge, MA, USA
- MHNG Muséum d'Histoire Naturelle, Geneva, Switzerland
- MJPL Museo de Historia Natural "Javier Prado", Lima, Peru
- MNCR Museo Nacional de Costa Rica, San José, Costa Rica
- MNHN Muséum National d'Histoire Naturelle, Paris, France
- MZSP Museo de Zoologia da Universidade de São Paulo, Brazil
- NHMB Naturhistorisches Museum, Basel, Switzerland
- NHMV Naturhistorisches Museum, Vienna, Austria

NHRS	Naturhistoriska Riksmuseet, Stockholm, Sweden
OSUO	Department of Entomology Collection, Oregon State University, Corvallis, OR, USA
PSWC	P. S. Ward Collection, University of California at Davis, CA, USA
SEMC	Snow Entomological Museum, University of Kansas, Lawrence, KS, USA
TAMU	Department of Entomology Insect Collection, Texas A&M University, College Station, TX, USA
UCDC	Bohart Museum of Entomology, University of California at Davis, CA, USA
UCRC	UCR Entomological Collection, University of California at Riverside, CA, USA
UNCB	Museo de Historia Natural, Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Bogotá, Colombia
USNM	National Museum of Natural History, Washington, DC, USA
UWEM	Entomology Museum, University of Wisconsin, Madison, USA
WPMC	W. P. MacKay Collection, College Station, TX, USA
WWBC	W. W. Benson Collection, Campinas, SP, Brazil
ZMHB	Zoologisches Museum, Museum für Naturkunde der Humboldt - Universität, Berlin, East Germany
ZMUC	Zoologisk Museum, University of Copenhagen, Denmark
ZMUH	Zoologisches Institut und Zoologisches Museum, Universität Hamburg, West Germany
ZSMC	Zoologische Sammlung des Bayerischen Staates, Munich, West Germany

Metric Measurements and Indices

Metric measurements were made at 50X power on a Wild microscope, with a dual-axis (X-Y) pair of Nikon micrometers wired to an Autometronics digital readout. All measurements were taken to the nearest thousandth of a millimeter. Most have been rounded to two decimal places for presentation here.

Some of the measurements described below differ from those used in taxonomic studies of other ants. These modifications are partly dictated by peculiarities of the Pseudomyrmecinae. For example, following Kempf (1960), the compound eyes are included in the measurement of head width in workers and queens (as well as males), because the maximum width of the head capsule frequently occurs behind the eyes and is blocked from view. In addition I use DPL (diagonal length of the propodeum; see below) as a proportional measure of mesosoma (=alitrunk) length rather than WL (Weber's length of the entire mesosoma) because the free articulation of the pronotum with the rest of the thorax renders the measurement of WL imprecise.

A number of important measurements are taken with the head in a full-face, frontal (*i.e.*, dorsal) view. To make such measurements comparable among all

pseudomyrmecine ants, the head is positioned so that its anterolateral margins (above the mandibular insertions) are in the same focal plane as the occipital margin (see Fig. 6). The head length (HL) which is measured in such a view includes the median clypeal lobe, but the axis of measurement is not unduly altered by a strong anterodorsal protrusion of the fronto-clypeal complex as occurs, for example, in some *Tetraponera*. As a result, HL is slightly less than the "maximum critical" head length (Brown, 1953), but it and other measurements which are taken in a full-face view of the head are more appropriate for comparisons across the entire subfamily.

For *Pseudomyrmex* workers and queens a full-face, frontal view of the head is roughly equivalent to positioning the median ocellus and the frontal carinae in the same plane of view (while turning the head so that the maximum possible head width is achieved). Such a positioning rule does not usually work in *Tetraponera*, due to discrepancies in head shape and the frequent lack of ocelli in workers.

In discussions below, the *antennal sclerite* is the sclerite which encircles the antennal fossa. In most ants, the inner margin of the antennal sclerite is developed as a *median lobe* (Fig. 3) which is raised dorsolaterally and often covers part of the basal condyle of the antenna. In pseudomyrmecine ants these same median lobes typically fuse with the frontal carinae anteromedially (Fig. 3); in many other ants the frontal carinae are themselves expanded laterally to form frontal lobes which cover the median lobes of the antennal sclerites.

The following is a list of measurements used in this and other continuing studies of pseudomyrmecine ants. Explanatory illustrations of some of these measurements are found in Ward (1985); see also Figs. 1-5 of this paper.

- | | |
|-----|---|
| HW | Head width: maximum width of head, including the eyes, measured in full-face dorsal view. |
| VW | Vertex width: width of the posterior portion of the head (vertex), measured along a line drawn through the lateral ocelli, with the head in full-face, dorsal view (see Fig. 1 in Ward [1985]). |
| HL | Head length: midline length of head proper, measured in full-face, dorsal view, from the anterior clypeal margin to the midpoint of a line drawn across the occipital margin. |
| EL | Eye length: length of compound eye, measured with the head in full-face, dorsal view. |
| OD | Ocellar distance: distance from the middle of the median ocellus to the midpoint of a line drawn between the lateral ocelli, measured with the head in full-face dorsal view (see Fig. 1 in Ward [1985]). |
| OOD | Oculo-ocellar distance: distance from the middle of the median ocellus to the midpoint of a line drawn across the posterior margins of the compound eyes, measured with the head in full-face, dorsal view (see Fig. 1 in Ward [1985]) (this distance is negative in value if the posterior margin of the compound eye exceeds the median ocellus). |

- CD Clypeal distance: distance from the anterior clypeal margin to the midpoint of a line drawn across the anterior margins of the antennal sclerites.
- MD1-MD9 A series of mandibular measurements (see Figs. 1, 2) taken with the mandibles removed from their insertions and mounted separately on a point. For measurements of width and overall length (MD1 - MD3), the mandible is positioned so that the dorsal abductor swelling and the apical tooth are in the same focal plane (Fig. 2) and it is then rotated on this axis until MD2, the width of the mandible at the juncture of the basal and masticatory margins, is made maximum. Measurements of the lengths of the basal and masticatory margins, and of the relative positioning of teeth along those margins (MD4 - MD9), are taken with the extreme ends of the respective margin in the same focal plane. If there is more than one mesial basal tooth, MD4 is the distance to the outermost one.
- MFC Minimum frontal carinal distance: minimum distance between the frontal carinae, posterior to their fusion with, or approximation to, the antennal sclerites (Fig. 4).
- ASD Antennal sclerite distance: maximum distance between the lateral margins of the median lobes of the antennal sclerites, measured in full-face, dorsal view of the head (Fig. 4).
- ASO Antennal sclerite distance, outer margins: maximum distance between the outer, lateral margins of the antennal sclerites (Fig. 4).
- EW Eye width: maximum width of compound eye, measured along its short axis, in an oblique dorso-lateral view of the head.
- EL2 Eye length: maximum length of compound eye, measured along its long axis in the same plane of view as EW.
- SL Scape length: length of the first antennal segment, excluding the radicle.
- LF1 Length of first funicular segment: maximum measurable length of the first funicular segment (pedicel), including its basal articulation in workers and queens but excluding the basal articulation in males (where it is usually hidden).
- LF2 Length of second funicular segment: maximum measurable length of the second funicular segment.
- LF3 Length of third funicular segment: maximum measurable length of the third funicular segment.
- WF2 Width of second funicular segment.
- FL Fore femur length: length of the fore femur, measured along its long axis in posterior view (see Fig. 3 in Ward [1985]).
- FW Fore femur width: maximum measurable width of the fore femur, measured from the same view as FL, at right angles to the line of measurement of FL.

- DPL Diagonal length of the propodeum; length of the propodeum, measured in lateral view along a diagonal line drawn from the "metapleural" lobe to the metanotal groove (see Fig. 2 in Ward (1985)).
- BF Length of the basal (=dorsal) face of the propodeum, measured in lateral view from the metanotal groove to the point on the surface of the propodeum which is maximally distant from the diagonal propodeal line.
- DF Length of the declivitous face of the propodeum, measured in lateral view from the metapleural lobe to the point on the surface of the propodeum which is maximally distant from the diagonal propodeal line.
- MP Depth of metanotal groove ("mesopropodeal impression"), measured in lateral view from the bottom of the metanotal groove to a line drawn across the dorsal surface of the mesonotum and propodeum.
- PL Petiole length: length of the petiole, measured in lateral view from the lateral flanges of the anterior peduncle to the posterior margin of the petiole (see Fig. 4 in Ward (1985)).
- PND Petiolar node distance: distance from the lateral flanges of the anterior petiolar peduncle to the maximum height of the node, measured from the same view as PL and along the same line of measurement (see Fig. 4 in Ward (1985)).
- PH Petiole height: maximum height of the petiole, measured in lateral view at right angles to PL, but excluding the anteroventral process.
- PPL Postpetiole length: length of the postpetiole, measured in lateral view, from the anterior peduncle (of the postpetiole) to the point of contact with the fourth abdominal tergite, excluding the pretergite (see Fig. 4 in Ward (1985)).
- DPW Dorsal petiolar width: maximum width of the petiole, measured in dorsal view.
- MPW Minimum petiolar width: minimum width of the petiole, measured in dorsal view, anterior to DPW.
- PPW Dorsal postpetiolar width: maximum width of the postpetiole, measured in dorsal view.
- LHT Length of hind tibia: maximum measurable length of hind tibia, excluding the proximal part of the articulation which is received into the distal end of the hind femur (Fig. 5).
- LHS Length of hind basitarsus: maximum measurable length of hind basitarsus.

Indices calculated from the preceding measurements include the following ratios (the orthodox but redundant and potentially misleading procedure of multiplying ratios by 100 has not been adopted):

CI	Cephalic index: HW/HL
OI	Ocular index: EW/EL
OI2	Ocular index, using EL2: EW/EL2
REL	Relative eye length: EL/HL
REL2	Relative eye length, using HW: EL/HW
OOI	Oculo-ocellar index: OOD/OD
VI	Vertex width index: VW/HW
FCI	Frontal carinal index: MFC/HW
FCI2	Frontal carinal index, using ASD: MFC/ASD
ASI	Antennal sclerite index: ASD/ASO
SI	Scape index: SL/HW
SI2	Scape index, using EL: SL/EL
FLI	Funicular length index: (LF2 + LF3)/WF2
FI	Fore femur index: FW/FL
PDI	Propodeal index: BF/DF
MPI	Metanotal index: MP/HW
NI	Petiole node index: PND/PL
PLI	Petiole length index: PH/PL
PLI2	Petiole length index, using PPL: PPL/PL
PWI	Petiole width index: DPW/PL
PWI2	Petiole width index, using PPW: DPW/PPW
PWI3	Petiole width index, using MPW: MPW/DPW
PPWI	Postpetiole width index: PPW/PPL
PPWI2	Postpetiole width index, using HW: PPW/HW

Other Conventions

Palp formula refers to the number of maxillary palp segments, followed by the number of labial palp segments. In counting the numbers of teeth on the basal and masticatory margins of the mandibles, the apico-basal tooth (see Fig. 1) is considered to be part of the dentition of the masticatory margin. The following setal counts are employed:

MSC	Mesosoma setal count: number of standing hairs, <i>i.e.</i> , those forming an angle of 45° or more with the cuticular surface (Wilson, 1955), visible in outline on the mesosoma dorsum in lateral view.
HTC	Hind tibial setal count: number of standing hairs visible in outline on the outer (extensor) surface of the hind tibia, with the line of view orthogonal to the plane of tibial flexion.
MTC	Mid tibial setal count: equivalent count for mid tibia.

Terms for surface sculpture follow Harris (1979). When material was examined under a light microscope, an opaque (Mylar) filter was placed between the source of

illumination and the specimen, at a distance of about 4 cm from the latter. The consequent reduction of glare renders the details of sculpture more visible, and permits greater discrimination between different degrees of reflectance of the integument. The terms opaque, subopaque, sublucid, and lucid are used to make distinctions along this continuum of reflectance, opaque indicating a lack of reflectance, on the one hand, and lucid referring to a strongly shining integument, on the other hand, *under the conditions of soft lighting described above*.

Scanning electron micrographs were taken with an ETEC Autoscan, using gold-palladium coated specimens.

The term *stat. nov.* is used for a change in status of a valid name (in all instances here: elevation from infraspecific to specific status), while *stat. reval.* refers to the revalidation of a name previously considered invalid (in all instances here: resurrection of a former synonym). The distinction between these two kinds of name changes was not made in Ward (1985).

In the lists of material examined, records are arranged alphabetically by country and by principal administrative region within larger countries. The abbreviations for Brazilian states follow Kempf (1972), with the following additions: MS = Mato Grosso do Sul; RR = Roraima.

The abbreviation "c.u." signifies collector unknown.

SYNOPSIS OF MAJOR SPECIES GROUPS IN *PSEUDOMYRMEX*

Among ants whose workers possess a distinct postpetiole and well-developed sting, those of *Pseudomyrmex* are recognized by their elongate compound eyes (OI 0.48–0.66, REL 0.36–0.68), closely set frontal carinae (FCI 0.01–0.13), and short scapes (SI 0.40–0.52). The median lobes of the antennal sclerites are also closely adjacent (ASI 0.41–0.73) and visible in a full-face view of the head. The antennae are 12-segmented. The mandibles are relatively small, with well differentiated basal and masticatory margins bearing 2–3 and 5–10 teeth, respectively.

Within the genus *Pseudomyrmex* I recognize currently nine major species groups, containing about 85% of the described taxa. The most salient worker characteristics of these groups are summarized in Table 1.

The outline of species groups is tentative, details of which undoubtedly will undergo refinement. The *pallens* group, in particular, appears to be rather heterogeneous and is probably paraphyletic. Additional undescribed species are in most of these groups; and there is a residue of taxonomically isolated species, and taxa of uncertain identity (*incertae sedis*). Nevertheless Table 1 should permit the assignment of most worker-based material of *Pseudomyrmex* to a species group.

The valid described taxa in each group are given below. All names are implicitly listed as binomina (since I expect all infraspecific names eventually either to enter synonymy or be raised to species), and the nomenclatural changes of this paper have been incorporated.

Table 1. Worker characteristics useful for distinguishing the major species groups of *Pseudomyrmex*. There are additional isolated taxa not belonging to these groups (see text).

Species group	Palp formula(e)	No. teeth on masticatory margin of mandibles ^a	Lateral corners of median clypeal lobe: rounded (or bluntly angled) versus sharply angulate	Pilosity on mesosoma dorsum: common (MSC > 10) versus sparse (MSC < 8)	Tibial pilosity: common (HTC + MTC > 10) versus sparse (HTC + MTC < 8)	Eye size: relatively short (REL 0.36–0.46) versus elongate (REL 0.48–0.68)	Other
<i>gracilis</i>	6,4	7–10	rounded ^b	common ^c	common ^c	elongate	pronotum laterally (sub)marginate
<i>tenuis</i>	6,4	6	rounded	sparse	sparse	elongate	metanotal groove lacking
<i>sericeus</i>	6,4,5,4	8–10	rounded	sparse	sparse	elongate	silky (sericeous) integument
<i>pallens</i>	6,4	5–6	rounded	usually sparse	sparse	variable	—
<i>viduus</i>	6,4,5,3,4,3	5–7	variable	common	common ^d	short	broad petiole (PWI > 0.70)
<i>oculatus</i>	6,3,5,3	5–6	rounded	common	usually sparse	elongate	protruding, tectiform median clypeal lobe
<i>subtilissimus</i>	6,3	5	rounded	sparse	sparse	elongate	frontal carinae not fusing with antennal sclerites
<i>pallidus</i>	5,3,4,3	5	angulate	sparse	sparse	variable	—
<i>ferrugineus</i>	5,3,4,3	6	variable	common	sparse	short	inhabiting swollen-thorn <i>Acacia</i>

^a Median number of teeth within a nest-series; occasional deviations occur^b Somewhat angulate in *P. laevigatus* (F. Smith)^c Except *P. simulans* Kempf^d Except *P. tucigalliae* (Forel)

"No." = Number

***P. ferrugineus* group**

alfari (Forel), *atrox* (Forel), *bicinctus* (Santschi), *ferrugineus* (F. Smith), *flavicornis* (F. Smith), *gaigei* (Forel), *infernalis* (Wheeler), *nigrocinctus* (Emery), *peltatus* (Menozzi), *peperi* (Forel), *scelerosus* (Wheeler), *spinicola* (Emery), *veneficus* (Wheeler).

***P. gracilis* group**

alternans (Santschi), *alvarengai* Kempf, *argentinus* (Santschi), *atrinodus* (Santschi), *atripes* (F. Smith), *bicolor* (Guérin), *browni* Kempf, *canescens* (F. Smith), *cladoicus* (F. Smith), *dimidiatus* (Roger), *excisus* (Mayr), *faber* (F. Smith), *glabriventris* (Santschi), *godmani* (Forel), *gracilis* (Fabricius), *laevigatus* (F. Smith), *maculatus* (F. Smith), *major* (Forel), *mexicanus* (Roger), *niger* (Donisthorpe), *nigropilosus* (Emery), *osurus* (Forel), *pilosulus* (F. Smith), *pupa* (Forel), *sericatus* (F. Smith), *simulans* Kempf, *squamiferus* (Emery), *unicolor* (F. Smith), *velifer* (Stütz), *venustus* (F. Smith), *volatilis* (F. Smith).

***P. oculatus* group**

alustratus Ward, *caeciliae* (Forel), *cretus* Ward, *cubaensis* (Forel), *curacaensis* (Forel), *eduardi* (Forel), *elongatus* (Mayr), *oculatus* (F. Smith), *pisinnus* Ward, *schuppi* (Forel), *urbanus* (F. Smith).

***P. pallens* group**

adustus (Borgmeier), *apache* Creighton, *championi* (Forel), *elongatulus* (Dalle Torre), *gibbinotus* (Forel), *incurrens* (Forel), *landolti* (Forel), *longus* (Forel), *lynceus* (Spinola), *monochrous* (Dalle Torre), *pallens* (Mayr), *phyllophilus* (F. Smith), *salvini* (Forel), *thoracicus* (Norton).

***P. pallidus* group**

acanthobius (Emery), *belgranoi* (Santschi), *brunneus* (F. Smith), *cocae* (Santschi), *colei* (Enzmann), *distinctus* (F. Smith), *ejectus* (F. Smith), *ethicus* (Forel), *euryblemma* (Forel), *fiebrigi* (Forel), *flavidulus* (F. Smith), *fuscatus* (Emery), *holmgreni* (Wheeler), *leptosus* Ward, *levivertex* (Forel), *lizeri* (Santschi), *pallidus* (F. Smith), *pazosi* (Santschi), *peruvianus* (Wheeler), *rochai* (Forel), *rufiventris* (Forel), *seminole* Ward, *simplex* (F. Smith), *solisi* (Santschi), *terminalis* (F. Smith), *virgo* (Santschi), *vistanus* (Enzmann).

***P. sericeus* group**

acaciaraum (Wheeler), *beccarii* (Menozzi), *castus* (Wheeler), *cordiae* (Forel), *fortis* (Forel), *heterogynus* (Wheeler & Mann), *huberi* (Santschi), *humboldi* (Enzmann), *ita* (Forel), *lisus* (Enzmann), *longior* (Forel), *pictus* (Stitz), *rubiginosus* (Stitz), *sericeus* (Mayr), *vinneni* (Forel).

***P. subtilissimus* group**

spiculus Ward, *subtilissimus* (Emery), *tenuissimus* (Emery), *villosus* Ward.

***P. tenuis* group**

boopis (Roger), *denticollis* (Emery), *tenuis* (Fabricius), *termitarius* (F. Smith).

***P. viduus* group**

concolor (F. Smith), *cordobensis* (Forel), *coronatus* (Wheeler), *dendroicus* (Forel), *endophytus* (Forel), *kuenckeli* (Emery), *malignus* (Wheeler), *nigrescens* (Forel), *opacior* (Forel), *rurrenabaquensis* (Wheeler & Mann), *symbioticus* (Forel), *tachigaliae* (Forel), *triplaridis* (Forel), *triplarinus* (Weddell), *viduus* (F. Smith).

Incertae sedis

antiguanus (Enzmann), *brunnipes* (Enzmann), *costaricensis* (Enzmann), *depressus* (Forel), *duckei* (Forel), *fervidus* (F. Smith), *filiformis* (Fabricius), *gebelli* (Forel), *goeldii* (Forel), *haytianus* (Forel), *laevifrons* Ward, *mandibularis* (Spinola), *oki* (Forel), *perboscii* (Guérin), *rufomedius* (F. Smith), *santschii* (Enzmann), *subater* (Wheeler & Mann), *voytowskii* (Enzmann), *weberi* (Enzmann), *wheeleri* (Enzmann).

TAXONOMIC TREATMENT OF *PSEUDOMYRMEX OCULATUS* AND
SUBTILISSIMUS GROUPS

PSEUDOMYRMEX OCULATUS GROUP

Introduction

Diagnosis (worker).— Small to medium-size species (HW 0.47–0.98), head longer than broad, often markedly so (CI 0.61–0.88), with medium to large eyes (REL 0.48–0.61); mandibles with external and basal margins parallel or diverging slightly (MD1/MD2 0.87–1.00); basal margin of mandibles with a single distal tooth, masticatory margin with five or (less commonly) six teeth; frontal carinae subcontiguous (FCI 0.017–0.047), fusing anterolaterally with the antennal sclerites, so that in lateral view the frontal carinae do not form a continuous curve with the clypeus (Fig. 17) (in contrast to the *P. subtilissimus* group, see below and Fig. 19); median lobe of clypeus tectiform, notably produced anteriorly, the anterior margin sharp-edged and weakly flared (Figs. 14–16); in dorsal view anterior margin of median clypeal lobe convex and laterally rounded; petiolar node relatively short and high (PLI 0.67–1.06), anterior peduncle not conspicuously developed. Head and mesosoma at least partly punctate, and usually with substantial areas of the integument opaque or subopaque. Erect pilosity conspicuous on most parts of body, including the antennae, legs, head, and dorsum of mesosoma. Body covered with light to moderate density of fine pubescence. Palpal formula: 6,3 (reduced to 5,3 in *P. eduardi*, *P. pisinnus*, and in some individuals of *P. caeciliae* and *P. urbanus*; these species are among the smallest in the group).

Comments.— The present concept of the *P. oculatus* group is a much expanded one from that given in Kempf (1961), who treated only three species. Within the *P. oculatus* group, I have included also the cluster of species allied to *P. elongatus* (Mayr) (the “*elongatus* group” of Ward [1985]). As presently defined, the *P. oculatus* group is minimally diagnosed by the following combination of worker features: tectiform clypeal lobe, with weakly flared, sharp-edged, anterior margin (Figs. 14–16); relatively short, high, apendunculate petiole (e.g., Figs. 7, 8, 9b, 10b); and conspicuous standing pilosity. Relationships with the *P. subtilissimus* group are discussed under the latter.

Within the *P. oculatus* group are several reasonably distinctive species, but a bewildering residue of forms remains centering around *P. caeciliae* (Forel), *P. cubaensis* (Forel) and *P. urbanus* (F. Smith). Species relationships within what may be called the *urbanus* complex have not been resolved fully in this study, and will require more extensive material and further analysis (particularly larger samples of worker-associated males and queens).

Synonymic List of Species

- P. alustratus* Ward, *sp. nov.* Peru
- P. caeciliae* (Forel, 1913), *stat. nov.* Texas to Panama
- P. cretus* Ward, *sp. nov.* Guatemala, Costa Rica
- P. cubaensis* (Forel, 1901b). Caribbean; Mexico to Bolivia
- P. curacaensis* (Forel, 1912). Panama to Bolivia, Brazil
- P. eduardi* (Forel, 1912). Jamaica; Costa Rica to Peru, Brazil
- P. elongatus* (Mayr, 1870). Florida; Mexico to Bolivia, Brazil
 - = *P. alliodorae* (Wheeler, 1942), *syn. nov.*
 - = *P. allidorus* (Enzmann, 1945).
 - = *P. tandem* (Forel, 1906).
- P. oculatus* (F. Smith, 1855). Mexico to Bolivia, Brazil
 - = *P. advena* (F. Smith, 1855).
 - = *P. dolichopsis* (Forel, 1899).
 - = *P. implicatus* (Forel, 1911).
 - = *P. altinodus* (Mann, 1916), *syn. nov.*
 - = *P. tuberculatus* (Enzmann, 1945), *syn. nov.*
 - = *P. wessoni* (Enzmann, 1945), *syn. nov.*
- P. pisinnus* Ward, *sp. nov.* Brazil, Peru
- P. schuppi* (Forel, 1901a). Argentina, Paraguay, Brazil
 - = *P. confusior* (Forel, 1901a).
 - = *P. geraensis* (Forel, 1912).
- P. urbanus* (F. Smith, 1877). Panama, South America
 - = *P. chodati* (Forel, 1920), *syn. nov.*
 - = *P. ogloblini* (Santschi, 1936), *syn. nov.*

Key to Species (workers and queens)

Note.— The queen caste is included tentatively in this key. To underscore the rather limited amount of material on which this is based, I have given sample sizes ($n = \dots$) for queen measurements. Sample sizes within single lugs of a couplet are all identical, and are not repeated after the first metric measurement.

- 1 Petiolar node broadly rounded in lateral profile, without strongly differentiated dorsal and posterior faces (e.g., Figs. 8,9b); summit of the node usually occurring in the middle third of the petiole length (NI 0.51–0.69) 2
- 1' Petiolar node with a flat, posteriorly uplifted, dorsal face, rounding suddenly into a vertical posterior face (Fig. 7); summit of node displaced to the posterior quarter of the petiole length (NI 0.72–0.85); medium-sized species (worker HW 0.73–0.91; queen HW 0.78–0.85, $n=7$) with broad head (worker CI 0.77–0.87; queen CI 0.71–0.76) and long eyes (worker REL 0.55–0.62; queen REL 0.53–0.57) (Mexico to Bolivia and Brazil) *P. oculatus* (F. Smith), p. 422
- 2 (1) Larger species, worker HW 0.74–0.98, usually greater than 0.79 (queen HW 0.78–0.95, $n=15$); if HW <0.79mm, then occipital margin of head concave (in frontal view) and dorsolateral margination of petiole relatively sharp so that in dorsal view the maximum petiole width appears to coincide with the lateral margination; funicular segments II and III ranging from slightly broader than long to notably longer than broad 3
- 2' Smaller species, HW <0.79; occipital margin of worker flat to weakly concave (in frontal view); dorsolateral margination of petiole rather gentle so that in dorsal view the maximum petiole width occurs slightly below the margination; funicular segments II and III broader than long, usually markedly so 5
- 3 (2) Petiole about as high as long in worker (Fig. 8) (worker PLI 0.94–1.07) and appearing about as broad as long in dorsal view (PWI 0.84–0.99) (in queens: PLI 0.81–0.85, PWI 0.78–0.85, $n=4$); head densely punctate, opaque (Argentina, Paraguay, s.e. Brazil) *P. schuppi* (Forel), p. 426
- 3' Petiole longer than high (Figs. 9b,10b) (worker PLI 0.71–0.89; queen PLI 0.57–0.76, $n=11$) and notably longer than broad in dorsal view (worker PWI 0.59–0.78; queen PWI 0.61–0.75); head punctate and sublucid, with small shiny interspaces between many of the punctures 4
- 4 (3') Larger species (worker HW 0.85–0.98; queen HW 0.90–0.95,

- n=3) with longer scapes and shorter eyes (worker SI2 0.74–0.80; queen SI2 0.69–0.73; worker REL2 0.62–0.65; queen REL2 0.68–0.71) (Fig. 9a); regressions of HL on HW and EL on HW lying below those of *curacaensis* (Figs. 26, 27) (Guatemala, Costa Rica).....*P. cretus*, *sp. nov.*, p. 412
- 4' Smaller species (worker HW 0.74–0.89; queen HW 0.78–0.88, n=8) with shorter scapes and relatively longer eyes (worker SI2 0.60–0.74; queen SI2 0.58–0.66; worker REL2 0.64–0.77; queen REL2 0.72–0.82) (Fig. 10a); regressions of HL and EL on HW lying above those of *cretus* (Figs. 26,27) (Panama south to Bolivia and Brazil).....*P. curacaensis* (Forel), p. 416
- 5 (2') Punctures on dorsum of worker head and pronotum contiguous almost throughout, rendering the integument largely opaque; in particular, punctures mostly contiguous and without extensive shiny interspaces (*i.e.*, separated by half their diameters or less) posteromesad of compound eye, and immediately posterior to compound eye (except for a thin shiny margin about 0.010–0.020 mm. wide), when viewed under a light microscope (see also SEM micrographs, Figs. 20, 21); queens similar but sometimes with slightly more extensive shiny interspaces between ocelli and compound eye..... 6
- 5' Dorsum of head and pronotum more extensively shiny or sublucid, especially in queens; at least some punctures separated by half their diameters or more, especially between the ocelli and compound eye, and immediately posterior to compound eye, when viewed under a light microscope (see also SEM micrographs, Figs. 22–25)..... 7
- 6 (5) Smaller species (worker HW 0.56–0.68, usually <0.65; queen HW 0.56–0.61, n=19; worker HL 0.73–0.93; queen HL 0.87–0.97) (Florida; Mexico south to Bolivia and Brazil)
.....*P. elongatus* (Mayr), p. 419
- 6' Larger species (worker HW 0.69–0.75; queen HW = 0.67, n=1; worker HL 0.96–1.04; queen HL = 1.05) (Peru)
.....*P. alustratus*, *sp. nov.*, p. 409
- 7 (5') Very small species (worker HW 0.47–0.51, queen unknown); worker with elongate head (CI 0.61–0.68), short scapes (SI2 0.50–0.54), long basal face of propodeum (PDI 1.46–1.69), and low petiole (PLI 0.67–0.77) (Fig. 11); light orange-brown (Brazil, Peru).....*P. pisinnus*, *sp. nov.*, p. 425
- 7' Larger species (worker HW 0.50–0.78) with broader head (worker CI 0.67–0.79) and longer scapes (worker SI2 0.55–0.74); at lower end of worker size range (HW 0.50–0.60),

- basal face of propodeum shorter (PDI 0.91–1.45) and petiole higher (PLI 0.79–0.92); color variable, often medium to dark brown 8
- 8 (7) Front of head smooth and shiny with scattered fine punctulae (Fig. 25); small (worker HW 0.50–0.57; queen HW 0.51–0.55, n=3), dark brown, shiny species (Jamaica; Costa Rica to Peru and Brazil) *P. eduardi* (Forel), p. 418
- 8' Front of head shiny to subopaque, with coarser (0.010 to 0.020 mm in diameter) and denser punctures, separated by 0–4 diameters (e.g., Fig. 24); size and color variable (*urbanus* complex) 9
- 9 (8') Larger species (worker HW 0.65–0.78; queen HW 0.65–0.76, n=17); at lower end of worker size range, fore femur is relatively slender and eyes relatively short (see Figs. 28,29) (Florida, West Indies, Mexico south to Brazil) *P. cubaensis* (Forel) (*s.l.*), p. 413
- 9' Smaller species (worker HW 0.51–0.66; queen HW 0.51–0.64, n=9); at upper end of worker size range, fore femur tends to be broader and eyes longer (Figs. 28,29) 10
- 10 (9) Larger species (worker HW 0.58–0.66; queen HW 0.58–0.64, n=3); ocellar distance (OD) generally smaller (worker OD/HW 0.103–0.149) (see Fig. 30); usually light orange-brown in color, sometimes darker (Panama, South America)..... *P. urbanus* (F. Smith), p. 427
- 10' Smaller species (HW 0.51–0.61, usually < 0.59; queen HW 0.51–0.59, n=6), with a larger ocellar distance (worker OD/HW 0.127–0.169) (see Fig. 30); medium to dark brown in color (Texas south to Panama)..... *P. caeciliae* (Forel), p. 410

Species Accounts

Pseudomyrmex alustratus sp. nov.

(Figures 13a, 13b)

Holotype worker.— PERU, Junín: Chanchamayo, Anashirone River, 16.vii.1963, C.A. Portocarrero #A47 (Kempf No. 4060) (MZSP). HW 0.73, HL 1.03, EL 0.59, PL 0.42, PH 0.35.

Paratypes.— Five workers, same data as holotype (BMNH, LACM, MCZC, MZSP). Seven workers, one dealate queen, same locality as holotype, 22.viii.1963, C.A. Portocarrero #73 (Kempf No. 4072) (MJPL, MZSP, PSWC).

Additional non-paratypic material is listed below.

Worker measurements (n=9).— HL 0.96–1.04, HW 0.69–0.75, MFC 0.018–0.024, CI 0.70–0.76, OI 0.55–0.58, REL 0.55–0.58, REL2 0.76–0.80, OOI 0.13–0.53, VI 0.80–0.86, FCI 0.024–0.034, SI 0.45–0.46, SI2 0.58–0.60, FI 0.47–0.53, PDI 1.32–1.58, MPI 0.040–0.055, NI 0.59–0.64, PLI 0.83–0.92, PWI 0.63–0.71, PPWI 1.18–1.43.

Worker diagnosis.— Medium-sized species (HW 0.69–0.75), with elongate head and eyes (Fig. 13a; CI 0.70–0.76, REL2 0.76–0.80); sides of head slightly convex, occipital margin weakly concave in full-face view; second and third funicular segments broader than long (FLI 1.49–1.69, $n=5$). Fore femur relatively broad; metanotal groove of moderate depth but not long; basal face of propodeum flat to slightly convex, not notably raised above level of mesonotum, longer than the declivitous face into which it rounds rather suddenly (the basal and declivitous faces of the propodeum form a distinct obtuse angle in some individuals). Petiolar node relatively short and high (Fig. 13b; see metrics), with a conspicuous, rounded subpetiolar process; postpetiole broader than long.

Mandibles striate with scattered punctures. Head and pronotum densely punctate and opaque (weakly sublucid in the centre of the pronotum); remainder of mesosoma punctate or coriaceous-imbriate, and subopaque. Petiole, postpetiole, and gaster subopaque to weakly shining, with numerous fine piligerous punctures. Fine erect pilosity and appressed pubescence common over most of the body, including the mesosoma dorsum. Medium brown, apices of appendages (antennae, legs) lighter in color; mandibles pale luteous.

Comments.— This species evidently is related closely to *P. elongatus*, from which it differs primarily in size (HW >0.68). The head is even more densely punctate and opaque than in most *P. elongatus* workers, the basal face of the propodeum tends to be relatively longer (compare PDI values), and the subpetiolar process is perhaps a little better developed than in *P. elongatus*. The punctate opaque head, elongate eyes (REL2 >0.76), relatively broad fore femur, and high, rounded petiole (PLI >0.82), distinguish *P. alustratus* from *P. cubensis*, the only species with which it overlaps substantially in size.

Biology.— Essentially nothing is known about the biology of *P. alustratus*. Two workers from Sotileja, Peru were foraging on *Ochroma*.

Material Examined.— Type material listed above plus the following: PERU Junín: Valle Chanchamayo, 800m (Weyrauch) (MZSP); Madre de Dios: Sotileja, jct. Río Manu & R. Sotileja (D.W. Davidson) (PSWC).

Pseudomyrmex caeciliae (Forel), *stat. nov.*

(Figures 23, 24, 28, 29, 30)

Pseudomyrma eduardi race *caeciliae* Forel, 1913: 214. Two syntype workers, Patulul, Guatemala (Peper) (MHNG) [Examined]. One worker here designated LECTOTYPE.

Worker measurements (n=26).— HL 0.73–0.91, HW 0.51–0.61, MFC 0.012–0.023, CI 0.67–0.74, OI 0.52–0.60, REL 0.48–0.55, REL2 0.72–0.81, OOI 0.22–0.80, VI 0.73–0.91, FCI 0.021–0.041, SI 0.42–0.49, SI2 0.55–0.63, FI 0.45–0.51, PDI 0.91–1.45, MPI 0.048–0.084, NI 0.55–0.63, PLI 0.79–0.91, PWI 0.61–0.74, PPWI 1.09–1.39.

Worker diagnosis.— Small species (HW 0.51–0.61) with elongate eyes (REL2 0.72–0.81); ocelli relatively well-separated, OD/HW > 0.127; sides of head subparallel, rounding into the occipital margin, the latter flat to weakly concave, in full-face view; second and third funicular segments broader than long, usually notably so (FLI 1.23–1.72, $n=5$). Fore femur relatively broad; metanotal groove well marked; basal face of propodeum flat to weakly convex, often raised perceptibly above the level of the mesonotum; basal face rounding into declivitous face of propodeum, to which it is subequal or slightly greater in length (see PDI values). Petiole relatively short and high (PLI >0.79), with an anteroventral process, variously developed; postpetiole of typical dimensions, broader than long.

Mandibles striate (sometimes weakly so), with scattered punctures. Head densely punctate, the punctures separated by shiny interspaces at least on parts of the upper third of the head, and especially in the area immediately posterior to the compound eye, so that these parts of the head appear sublucid to shiny (in contrast to the predominantly opaque head of *P. elongatus*); head punctures (Figs. 23, 24) relatively coarse, 0.010 to 0.020 mm in diameter; mesosoma punctate to coriarius-imbricate, sublucid in the centre of the pronotal and mesonotal discs, and on the side of the pronotum, more opaque elsewhere; petiole, postpetiole, and gaster sublucid, with numerous fine piligerous punctures. Fine, erect pilosity (sometimes rather short) and appressed pubescence common over most of the body, including the mesosoma dorsum. Body medium to dark brown in color, the mandibles, antennae, and tarsi varying from concolorous to a paler luteous brown.

Comments.— This previously overlooked species ranges from Texas to Panama. It includes populations from Texas and parts of Mexico which I misidentified as *P. elongatus* in Ward (1985). The characteristic features of *P. caeciliae* are its small size, relatively dark color, and the sublucid punctate appearance of parts of the head and mesosoma. It is distinguished from *P. elongatus* primarily on the basis of this shiny appearance (all of their metric measurements overlap broadly, although *P. elongatus* averages larger in size, with relatively longer eyes – compare HW, HL and REL). Typically *P. elongatus* workers have a densely punctate and opaque head, while in *P. caeciliae* the punctures on the head are less dense, with (correspondingly) more extensive shiny interspaces between them, especially in the area immediately posterior to the compound eye (see Figs. 20, 21, 23); but both species vary considerably, and the extremes of sculptural variation come close to overlapping.

Among material examined in the present study, an old series of workers from Escuintla, Guatemala (Wheeler leg.) included both *P. elongatus*, *P. caeciliae*, and several individuals seemingly intermediate between the two. In western Mexico (Jalisco, Sinaloa), where *P. caeciliae* is apparently absent, some *P. elongatus* workers approach *P. caeciliae* in head sculpture. On the other hand in Costa Rica, where the two species are broadly sympatric, I have seen no intermediates among material referable to the two species.

P. caeciliae differs from *P. cubaensis* by its smaller size (HW <0.62), relatively longer eyes (REL2 0.72–0.81) (Fig. 28), broader fore femur (Fig. 29), and shorter petiole. While Mexican and Central American populations of these two species are rather distinct, Jamaican “*caeciliae*” partly bridge the gap between the two. These Jamaican individuals may, in fact, represent small *P. cubaensis*.

The relationship of *P. caeciliae* to the South American species, *P. urbanus*, is even more problematic. The existing differences between the two are slight (see key to species) and not wholly diagnostic. More material, especially worker-associated queens and males from northern South America, will be needed to resolve this issue.

Biology.— *P. caeciliae* has been collected nesting in dead twigs of *Quercus* and *Prosopis* in Texas and northern Mexico. Costa Rican nest-site records include dead twigs of *Gliricidia sepium*, *Anacardium* and *Laguncularia racemosa*. Habitat records cover a broad range (tropical dry forest, mangrove, littoral vegetation, riparian forest, edge of second-growth rain forest, rain forest) but suggest a

preference for open areas. In Costa Rica the species is notably less common than *P. elongatus*.

Material Examined (CDAE, CNCC, GCWC, JTLCL, LACM, MCZC, MHNG, MZSP, PSWC, USNM).—

COSTA RICA *Guanacaste*: 6 mi S, 6 mi W Cañas, Taboga (D. H. Janzen); Hda. La Pacifica, nr. Cañas, 50 m (P. S. Ward); Palo Verde (C. M. Herrera); Santa Rosa Natl. Pk. (D. H. Janzen); Santa Rosa Natl. Pk., < 5 m (P. S. Ward); *Limon*: Talia Farm, Estrella Valley (G. C. Wheeler); *Puntarenas*: 9.7 mi W Esparita (D. H. Janzen); Boca Barranca (D. H. Janzen); Estrella, 300 m (J. T. Longino); Golfito, 5 m (P. S. Ward); Manuel Antonio Natl. Pk., 10 m (P. S. Ward); Manuel Antonio Natl. Pk., < 5 m (P. S. Ward); Pita, 120 m (J. T. Longino); Pita, 200 m (J. T. Longino); Sarmiento, 200–300 m (J. T. Longino); Sirena, Corcovado Natl. Pk., 10 m (P. S. Ward); Sirena, Corcovado Natl. Pk., 50 m (J. T. Longino); *San José*: 2 mi. W Río Oro (D. H. Janzen); 40 km S San Isidro de General (D. H. Janzen); San José (H. Schmidt).

GUATEMALA *Escuintla*: Escuintla (W. M. Wheeler; N. L. H. Krauss); *Izabal*: Los Amates (Kellerman); *Suchitepéquez*: Patulul (Peper).

HONDURAS *Atlántida*: La Ceiba (F. S. Dyer); *Cortés*: Choloma (W. M. Mann).

JAMAICA Kingston (A. Forel); Ford 1 mi SE Stony Creek (E. A. Chapin).

MEXICO "Mexico", intercepted at Brownsville (c.u.); *Camp*: 29 mi E, 12 mi S Campeche (Ruinas Edzna) (D. H. Janzen); *N.L.*: El Pastor, Montemorelos, 2200 ft. (W. S. Creighton); *S.L.P.*: 3 mi N Valles, 300 ft. (W. S. Creighton); *Tamps*: 6.2 mi S San Fernando on Hwy 101 (D. H. Janzen); Cañon del Abra, 1000 ft. (W. S. Creighton); *Ver.*: Camarón (E. Skwarra).

NICARAGUA *Estelí*: 7.5 mi NW San Isidro, 550 m (D. H. Janzen).

PANAMA *Chiriquí*: "Prov. Chiriquí" (F. M. Gaige); *Panamá*: Trinidad Río (A. Busck).

UNITED STATES *Texas*: *Cameron Co.*: 10 mi W Boca Chica (R. R. Snelling); 5 mi W Boca Chica (G. C. & J. Wheeler); Brownsville (H. S. Barber, c.u.); Harlingen (W. F. Buren); *Hidalgo Co.*: Mission (W. F. Buren); Monte Alto, 60 ft. (W. S. Creighton); *Kenedy Co.*: 26 mi N Raymondsville (W. S. Creighton).

Pseudomyrmex cretus, sp. nov.

(Figures 9a, 9b, 26, 27)

Holotype worker.— **COSTA RICA**, *Prov. Guanacaste*: Santa Rosa Natl. Park, 300m, 10°51'N, 85°37'W, 14.xii.1983, ex dead twig of *Schoepfia*, tropical dry forest, P. S. Ward acc. no. 6434 (MCZC). HW 0.95, HL 1.18, EL 0.61, PL 0.52, PH 0.42.

Paratypes.— Same locality and date as holotype, P. S. Ward acc. nos. 6434 and 6427–2: two series of workers; **COSTA RICA**, *Prov. Guanacaste*: Santa Rosa Natl. Park, 270m, 10°50'N, 85°38'W, 14.xii.1983, P. S. Ward acc. nos. 6443, 6444, 6446, and 6448, workers and dealate queens. (BMNH, INPA, IZAV, LACM, MCZC, MJPL, MNCR, MZSP, PSWC, UCDC, UNCB, USNM)

Type material restricted to the above series from Santa Rosa National Park, Costa Rica. Additional material, believed to be conspecific, is listed below.

Worker Measurements (n=14).— HL 0.99–1.22, HW 0.85–0.98, MFC 0.027–0.035, CI 0.78–0.86, OI 0.57–0.60, REL 0.49–0.53, REL2 0.62–0.65, OOI 0.07–0.35, VI 0.74–0.81, FCI 0.028–0.039, SI 0.46–0.50, SI2 0.73–0.80, FI 0.40–0.46, PDI 1.21–1.43, MPI 0.047–0.068, NI 0.60–0.65, PLI 0.77–0.89, PWI 0.69–0.78, PPWI 1.21–1.50.

Worker Diagnosis.— A relatively large species for the *P. oculatus* group (HW 0.85–0.98), with broad head, long scapes, and relatively short eyes (Fig. 9a; SI2 0.73–0.80); sides of head broadly convex, occipital margin weakly concave in frontal view; second and third funicular segments as long as, or longer than, wide (FLI 1.94–2.40, n=5). Fore femur relatively slender; metanotal groove conspicuous but not sharply excavated; basal face of propodeum flat to weakly convex, raised slightly above the level of the mesonotum, longer than the declivitous face from which it is usually well differentiated; juncture of basal

and declivitous faces of propodeum often marked laterally by a slight angle, which continues as weak margination flanking the flat declivitous face. Petiole (Fig. 9b) apendunculate with a well-developed anteroventral process, the node high and broadly rounded in lateral view, rather broad in dorsal view (see petiolar indices); lateral margination of petiolar node more marked than in most other species of the *oculatus* group; postpetiole notably broader than long.

Mandibles striato-punctate; head densely punctate, subopaque, upper third becoming sublucid due to shiny interspaces between the punctures (which are separated by 0.25 to 1.0 their diameters); mesosoma punctate to coriarius-imbricate, the mesonotum and centre and sides of pronotum sublucid, remainder mostly opaque. Petiole, postpetiole, and gaster sublucid, the lustre subdued by numerous fine piligerous punctures and associated pubescence. Fine erect pilosity and appressed pubescence common on most of the body, including mesosoma dorsum; the pilosity a little longer and denser than is typical for the *oculatus* group. Light to medium castaneous brown, the gaster and femora darker brown (variably so), with varying degrees of modest infuscation of the mesosoma; mandibles paler, luteous brown.

Comments.— The combination of large size (HW > 0.84) and petiole shape (node longer than high, broadly rounded in lateral view) separates *P. cretus* from all other species except *P. curacaensis*. *P. cretus* and *P. curacaensis* appear to be sister species; their males both possess unusually lengthened palpal segments and shortened antennal segments, conditions not known to occur in other members of the *P. oculatus* group.

The worker of *P. cretus* averages larger in size than that of *P. curacaensis*, and in the region of size overlap (HW 0.85–0.90) it possesses a broader head, shorter eyes, and longer scapes (see Figs. 26, 27, and worker key). The two species have not been collected sympatrically, *P. cretus* being known from Guatemala and Costa Rica, *P. curacaensis* from Panama and most of South America. It is possible that intermediate populations will be located in Central America, and the name *P. cretus* would then become a junior subjective synonym of *P. curacaensis*, but the Panama collections of *P. curacaensis* which I have examined do not approach *P. cretus* in size or head shape.

Biology.— The available records suggest that *P. cretus* is an inhabitant of tropical dry forest. Colonies have been collected in dead twigs of *Gliricidia sepium* and *Schoepfia* sp. at the type locality (Santa Rosa National Park, Costa Rica). At the same locality workers were observed foraging on low vegetation and visiting extrafloral nectaries of *Croton*. Workers collected at Estrella, Costa Rica (J. Longino leg.) appeared to be nesting in a dead fence post.

Material Examined.— Type material listed above, plus the following (JTLG, LACM, MZSP, PSWC):

COSTA RICA *Guanacaste*: 5 km S. Liberia (D. H. Janzen); La Cruz, 250 m (J. T. Longino); Palo Verde (D. E. Gill; C. M. Herrera); Santa Rosa Natl. Park (L. Gillespie; D. H. Janzen); Santa Rosa Natl. Park, 100 m (J. T. Longino); *Puntarenas*: Estrella, 300m (J. T. Longino); Pita, 200m (J. T. Longino).

GUATEMALA *Retalhuleu*: N edge Champerico (D. H. Janzen); 2 mi. NE Champerico (D. H. Janzen).

Pseudomyrmex cubaensis (Forel)

(Figures 22, 28, 29)

Pseudomyrma elongata var. *cubaensis* Forel, 1901b: 342. Holotype (unique syntype) worker, Bahía Honda, Cuba (M. J. Schmitt) (MHNG) [Examined].

Pseudomyrma elongata var. *cubaensis* Forel; Forel, 1913: 215. [Description of queen].

Pseudomyrmex elongata; Creighton (nec Mayr), 1955: 18. (partim) [Synonymy of *P. cubaensis* under *P. elongatus*].

Pseudomyrmex cubaensis (Forel); Ward, 1985: 226. [Revalidated as a distinct species].

Worker measurements, Florida and Caribbean (*cubaensis* s.s.) (n=24).— HL 0.89–1.02, HW 0.65–0.73, MFC 0.017–0.029, CI 0.71–0.75, OI 0.52–0.58, REL 0.47–0.51, REL2 0.65–0.71, OOI 0.41–0.95, VI 0.74–0.84, FCI 0.024–0.044, SI 0.44–0.48, SI2 0.64–0.74, FI 0.42–0.48, PDI 1.09–1.44, MPI 0.038–0.084, NI 0.53–0.63, PLI 0.67–0.78, PWI 0.55–0.71, PPWI 1.01–1.28.

Worker measurements, mainland Latin America (*n=31*).— HL 0.82–1.06, HW 0.65–0.78, MFC 0.015–0.031, CI 0.69–0.79, OI 0.53–0.60, REL 0.50–0.56, REL2 0.66–0.76, OOI 0.16–0.73, VI 0.75–0.86, FCI 0.022–0.044, SI 0.44–0.50, SI2 0.60–0.72, FI 0.41–0.50, PDI 1.12–1.51, MPI 0.038–0.066, NI 0.54–0.68, PLI 0.75–0.88, PWI 0.57–0.71, PPWI 1.13–1.36.

Worker diagnosis (*cubaensis* s.s.).— Medium-sized species (HW 0.65–0.73), with elongate head and relatively short eyes (REL 0.47–0.51); sides of head shallowly convex, occipital margin flat to slightly concave, in frontal view; funicular segments II and III broader than long. Fore femur only moderately swollen; metanotal groove conspicuously impressed; basal face of propodeum more or less flat, raised slightly or not at all above level of mesonotum, rounding gently into the declivitous face which it exceeds in length. Petiole apicululate, with a conspicuous anteroventral process (blunt or tooth-like), node rather long relative to its height (see metrics), and with gentle dorsolateral margination; postpetiole slightly longer than broad.

Mandibles striato-punctate; head (Fig. 22) densely punctate, subopaque to sublucid, with rather conspicuous shiny interspaces between the punctures on the upper third of the head, especially between the ocelli and the compound eye and immediately posterior to the eye. Mesosoma punctate to coriarius-imbriate, subopaque, with sublucid areas on the side of the pronotum and centre of the pronotum and mesonotum; petiolar node sublucid, especially its posterior face; postpetiole and gaster sublucid, covered with numerous fine piligerous punctures. Fine erect pilosity and appressed pubescence covering most of body, including mesosoma dorsum. Medium to dark brown, the antennae, mandibles, and tarsi lighter in color.

Comments.— The above description applies to the populations of *P. cubaensis* inhabiting Florida and the Caribbean. Elsewhere, in Mexico, Central America, and South America is a variable array of *cubaensis*-like populations which I currently treat as conspecific with the Caribbean form. Workers in these mainland populations tend to have longer eyes and a shorter and higher petiole (compare REL, REL2, and PLI in the lists of measurements given above). They also tend to be lighter in color, especially in South America where some populations contain rather large orange-brown workers, quite different in appearance from Caribbean *P. cubaensis*. Taken together as a whole, however, these mainland populations overlap in size, shape, and color with the more typical *P. cubaensis*, and I find no clear discontinuities in the available (largely worker-based) material. Future work involving the analysis of queens, males, or biochemical characters might well reveal several cryptic species.

P. cubaensis (s.l.) can be diagnosed minimally by the combination of medium size (HW 0.65–0.78); a punctate-sublucid head; relatively short eyes (REL2 0.65–0.76); moderately broad fore femur (FI 0.41–0.50); and petiole with rounded dorsolateral margination. The largest workers of *P. cubaensis* (s.l.) from South America overlap in size with the smallest workers of *P. curacaensis*; they are distinguished from the latter by the possession of a broader fore femur, longer head, flatter occipital margin, shorter funicular segments, and gentler dorsolateral margination of the petiole (see discussion under *P. curacaensis*). At the lower limits

of its size range, *P. cubaensis* (s.l.) can be difficult to distinguish from *P. urbanus*. Workers of the latter have broader fore femora and longer eyes for a given head width, compared to *P. cubaensis* (s.l.) (see scatter plots in Figs. 28 and 29, but note the variation).

Workers of *P. cubaensis* (s.l.) differ from those of *P. elongatus* by their larger average size, shorter eyes and lower petiole height in the region of size overlap, and subclucid head and mesosoma.

Biology.— In the Caribbean region, colonies of *P. cubaensis* occupy dead stems of various woody and herbaceous plants (Ward, 1985), often in littoral environments. Mainland populations come from a variety of habitats, including tropical dry forest, savannah, roadside verge, second-growth lowland rain forest, rain forest edge and montane rain forest edge. Nesting habits of these mainland populations are probably also generalized, but unfortunately most records consist of foraging workers rather than nest series.

Material examined (BMNH, CASC, CKIC, CNCC, CUIC, EBCC, INPA, IZAV, JTLC, KWJC, LACM, MCSN, MCZC, MHNG, MNHN, MZSP, PSWC, UCDC, USNM, WPMC).—

P. cubaensis (s.s.)

BAHAMAS Andros I. (W. M. Wheeler); Conception I., S. Bahamas (J. Greenway); Crooked Is., Gun Point (B. Valentine & R. Hamilton); Fish Hawk Key, Andros I. (W. M. Wheeler); High Ridge Cay (W. M. Mann); Mangrove Cay, Andros I. (B. Cole); Nassau (W. M. Wheeler); New Providence (B. Cole).

CAYMAN ISLANDS. Grand Cayman (M. E. C. Giglioli); Little Cayman (F. Banks).

CUBA "Cuba" (Cresson; c.u.); 7 km N Vinales (c.u.); Aguada de Pasajeros (W. M. Wheeler); Anafe, Habana (G. Aguayo); Bahía Honda (Wickham; c.u.); Bolondron (W. M. Wheeler); Cabada (W. M. Mann); Cabanas, Pinar del Rio (c.u.); Cayamas (Baker; E. A. Schwarz); Cienaga de Zapata (W. M. Wheeler); Cienfuegos (W. M. Mann); Cristo (W. M. Mann); El Caney (W. M. Mann); Gomez Mena (San Nicholas) (G. Salt); Guanajay, Pinar del Rio (E. O. Wilson); Guantánamo (W. M. Mann); Guavivito Cave, Soledad (Fal. Smith); Hanabaniña Falls, Trinidad Mts. (G. Salt); Harvard Bot. Gardens, Soledad, Cienfuegos (N. A. Weber); Havana (A. Bierig; P. Serre); Hormiguero (H. J. MacGillivray); Jaruca, Habana (P. Bermudez); Jiquari (Barbour & Shaw); Juraguá, Las Villas Prov. (E. O. Wilson); La Milpa, nr. Cienfuegos (G. Salt); Limones (W. M. Mann); Limones Seboruco (N. A. Weber); Malas Aguas, Pinar del Rio (E. O. Wilson); Mina Carola, Trinidad Mts. (W. M. Mann); Pied. de las Tunas (W. M. Mann); Pinar del Rio (H. J. MacGillivray); Pinares, Oriente (W. M. Mann); Rio Hanabana (c.u.); San Blas, Trinidad Mts., Santa Clara (c.u.); Santa Clara, Las Villas Prov. (E. O. Wilson); Soledad (J. G. Myers; Fal. Smith); Soledad Gardens (F. M. Carpenter); Soledad, Cienfuegos (C. T. Brues; C. T. & B. B. Brues; W. S. Creighton; Darlington); Soledad, nr. Cienfuegos (N. Banks); Viñales, Pinar del Rio (A. F. Arden); nr. Casa Harvard, Soledad, Cienfuegos (N. A. Weber).

HAITI "Haiti" (E. C. Leonard); Grande Rivière (W. M. Mann); Mts. N of Jacmel (W. M. Mann).

JAMAICA Balaclava (Wight); Bluefields Bay (E. A. Chapin); Kingston (N. L. H. Krauss; c.u.); St. Elizabeth, Pedro Cross, 230 m (J. T. Longino); Troy (Wight); Westmor, Auchindown, 150 m (J. T. Longino).

UNITED STATES Florida: Charlotte Co.: 5 mi S Punta Gorda (E. S. Ross); Punta Gorda (c.u.); Collier Co.: Collier-Seminole St. Pk. (P. S. Ward); Marco (W. T. Davis); Dade Co.: no specific locality (J. N. Knull); Biscayne Bay (A. Slosson); Cards Point (W. M. Wheeler); Long Pine Key (W. M. Wheeler); Miami (F. N. Young); Miami & vicinity (A. E. Wight); Miami Beach (W. L. Brown; A. C. Cole); Paradise Key (D. Fairchild; A. Wetmore; W. M. Wheeler); Paradise Key, Everglades Nat. Pk. (T. H. & S. P. Hubbell); Highlands Co.: no specific locality (F. J. Moore); Archbold Biol. Stn. (R. Silberglied); Highlands Hammock St. Pk. (L. & C. W. Obrien); nr. Sebring (R. W. Klein); Hillsborough Co.: no specific locality (J. C. Bowyer); R. F. Tinker; Tampa (M. H. Muma); Lake Co.: no specific locality (W. A. Hiers); Lee Co.: "Ft. Meyers" (c.u.); Ft. Myers (J. C. Bradley); Monroe Co.: Key West (c.u.); Lower Matecumbe Key (W. M. Wheeler); N. Key Largo (R. W. Klein); No Name Key (P. S. Ward); Osceola Co.: Lake Alfred (M. H. Muma); Palm

Beach Co.: Boynton Beach (Wood & Davidson); *Sarasota Co.*: 30 mi SE Sarasota, T38S, R22E, S33 (J. T. Longino); Long Branch Key, Sarasota (A. C. Cole); *Sarasota (A. C. Cole)*; *Seminole Co.*: Sanford (A. B. Gahan).

P. cubaensis, mainland

ARGENTINA *Misiones*: El Dorado (N. Kusnezov); *Esperanza* (N. Kusnezov); *Salta*: Coronel Moldes (Monros).

BOLIVIA *Beni*: 14 km SW San Borja, 210 m (P. S. Ward); *Espirito* (F. Koya).

BRAZIL *AM*: Ig. Marianil, Rio Branco Rd., 24 km NE Manaus (W. L. Brown); Manaus to Itacotiara Hwy, km. 34 (W. L. & D. E. Brown); *MT*: Vila Vera (M. Alvarenga); *PA*: C. Araguaia (J. A. Rafael); *Tucuruí* (W. L. Overall); *PE*: Ilha Fernando Noronha (M. Alvarenga); *RJ*: Monumento Rodoviário (c.u.).

COLOMBIA *Cauca*: Popayán (W. & E. MacKay); Medellín, 1800 m (N. A. Weber); *Magdalena*: Gairaca Bay, Parque Tayrona, 0–5 m (C. Kugler); *Meta*: Pto. López (W. & E. MacKay).

COSTA RICA "Costa Rica" (F. Nevermann); *Alajuela*: 11 mi N Florencia (D. H. Janzen); *Guanacaste*: Est. Biol. Palo Verde, 10 m (J. T. Longino); N side Lago de Arenal, 570 m (J. T. Longino); Palo Verde (C. M. Herrera); *Heredia*: 3 km S Pto. Viejo, 50 m (J. T. Longino); *Limon*: 5 mi. W Guapiles (D. H. Janzen); Hamburg Farm, Santa Clara (F. Nevermann); *Puntarenas*: 1 km NE Tárcoles, 20 m (P. S. Ward); Monteverde, 1100 m (P. S. Ward); Ojo de Agua, 800 m (J. T. Longino); Sirena, Corcovado Natl. Pk., 0–100 m (J. T. Longino); Sirena, Corcovado Natl. Pk., 50 m (J. T. Longino); *San José*: San Isidro de General (C. L. Hogue); San José (H. Schmidt).

GUATEMALA *Escuintla*: Escuintla (W. M. Wheeler); *Guatemala*: hills above Lake Amatitlán (D. H. Janzen); *Izabal*: Lago Izabal, 1.5 km NE El Estor (D. H. Janzen).

GUYANA *Mazaruni-Potaro*: Kartabo, Bartica Dist. (W. M. Wheeler); Kartabo Point (W. Steiner et al.).

MEXICO *Camp.*: 29 mi E, 12 mi S Campeche (Ruinas Edzna) (D. H. Janzen); *Gro.*: 25.4 mi S Chilpancingo (D. H. Janzen); *Is. Tres Marias*: Maria Madre I. (H. H. Keifer); Maria Magdalena I. (R. R. Snelling); *Jal.*: Est. Biología Chamela, 100 m (P. S. Ward); *Mich.*: 9 mi E Capirio, 800 ft. (E. Fisher & P. Sullivan); *Mor.*: 5 mi S Cuernavaca (W. S. Ross); *Sin.*: 20 mi E Villa Union, 235 m (E. I. Schlinger); *Tab.*: 3 mi W Cárdenas (D. H. Janzen); 13 km W border Chiapas, Rt. 186 (W. P. MacKay); *Ver.*: 9 km NNW Sontecomapan, 20 m (P. S. Ward); 10 km NW Isla, Ruta 145, 10 m (W. P. MacKay); Est. Biol. "Los Tuxtlas", nr. San Andrés Tuxtla (G. Ibarra M.); Los Tuxtlas, 10 km NNW Sontecomapan, 200 m (P. S. Ward); Mirador (E. Skwarra); Palma Sola (P. Reyes); Sontecomapan (D. H. Janzen).

PANAMA *Canal Zone*: vic. Pta de los Chivos, 3 km SW Gatun, 100 m (W. L. Brown et al.).

PERU *Loreto*: Yurac, 67 mi E Tingo Maria (E. I. Schlinger & E. S. Ross).

VENEZUELA *Aragua*: El Limon, 480 m (C. J. Rosales); *Barinas*: Pueblo Nuevo (H. Romero); 17 km SSW Ciudad Bolivia, 240 m (P. S. Ward); *Cojedes*: 20 km W San Carlos (W. L. & D. E. Brown); *Monagas*: Caripe (EMC, JL, CHFH); Uvero (C. J. Rosales & J. A. Gonzales).

Pseudomyrmex curacaensis (Forel)

(Figures 10a, 10b, 26, 27)

Pseudomyrmex dolichopsis var. *curacaensis* Forel 1912: 29. Two syntype workers, Curaçao (Bugnion) (MHNG) [Examined]. One syntype here designated LECTOTYPE.

Pseudomyrmex curacaensis [sic] (Forel); Kempf, 1961: 379 [Raised to species].

Worker measurements ($n=37$).— HL 0.85–1.21, HW 0.74–0.89, MFC 0.014–0.037, CI 0.70–0.88, OI 0.53–0.59, REL 0.51–0.58, REL2 0.64–0.77, OOI (–0.04)–0.47, VI 0.74–0.86, FCI 0.018–0.044, SI 0.44–0.49, SI2 0.60–0.74, FI 0.42–0.49, PDI 1.09–1.60, MPI 0.030–0.059, NI 0.56–0.69, PLI 0.71–0.89, PWI 0.59–0.78, PPWI 1.15–1.64.

Worker diagnosis.— Similar to *P. cretus* (q.v.); averaging smaller in size (HW 0.74–0.89), with longer head, shorter scapes, and longer eyes (Fig. 10a) (SI2 0.60–0.74; REL2 0.64–0.77) (see also Figs. 26 and 27); occipital margin varying from flat to (frequently) rather conspicuously concave, in full-face frontal view; funicular segments II and III about as long as broad, or nearly so (FLI 1.55–2.04, $n=6$). Propodeum and petiole (Fig. 10b) similar to that of *P. cretus*, except correspondingly more slender in smaller individuals. Sculpture, pilosity, and pubescence more or less as in *P. cretus*. Color variable: typically medium to dark brown, with lighter appendages, and a darker infuscated patch on the upper third of the

head, including the ocelli; some populations (e.g., northern Colombia, Curaçao) have workers which are lighter orange-brown in color, with contrasting dark brown hind femur, postpetiole, and gaster.

Comments.— It is curious that this species, one of the more common members of the *P. oculatus* group, has been unrecognized since its original description. Kempf (1961) raised *P. curacaensis* to species without being able to identify any material referable to it. In collections I have often found specimens of *P. curacaensis* misidentified as *P. oculatus*, to which they bear only a superficial resemblance, having a very different petiole shape (compare Figs. 7 and 10b) and head sculpture.

The key characteristics of *P. curacaensis* are its relatively large size, sublucid-punctate head, and relatively sharp lateral margination of the petiole (such that, in dorsal view, the maximum width of the petiole occurs at, rather than below, the dorsolateral margination). In lateral view, the petiolar node (Fig. 10b) presents a rounded profile, typical of the *P. oculatus* group. *P. curacaensis* is very closely related to the Central American species, *P. cretus*; for distinguishing features see the description above, the keys to workers and queens, and the discussion under *P. cretus*. At the lower end of its size range (worker HW 0.74–0.79), *P. curacaensis* may be confused with *P. cubaensis* (s.l.); the most useful distinguishing characters are the marginate petiole, more markedly concave occipital margin, and the more elongate funicular segments, of *P. curacaensis*. The infuscated patch around the ocelli also tends to be characteristic, but it is not invariably present. Finally, *P. curacaensis* tends to have a less elongate head, and a more slender fore femur, than *P. cubaensis*.

Biology.— I have encountered this species in a broad range of habitats, from tropical thorn forest and roadside vegetation to primary and second-growth rain forest. Nest-site records include dead twigs or branches of *Prosopis juliflora*, *Gliricidia sepium*, *Triplaris* sp., *Pilosocereus lanuginosus*, and unidentified bombacaceous and leguminous trees.

Material examined (BMHN, CASC, CDAE, GHPC, INPA, IZAV, KWJC, LACM, MCSN, MCZC, MHNG, MNHN, MZSP, NHMB, PSWC, UCDC, USNM, UWEM, WPMC, WWBC).—

BOLIVIA *Beni*: Blancaflor (W. M. Mann); Espiritu (F. Koya).

BRAZIL AM: "Amazonas" (Bates); Praia Grande, Rio Negro, Manaus (W. W. Benson); Res. Campina, Manaus (W. W. Benson); Rio Tarumá Mirim-Igapó (J. Adis); Tarumá-Mirim (J. Adis); BA: Salvador (W. W. Kempf); CE: Itapipoca (C. R. Gonçalves); GO: Jataí (F. M. Oliveira); MA: Bacabal (W. W. Kempf); MG: Arassuaí (Thieman); Campo Grande (Gilbert & Müller); MS: Faz. Dr. José Mendes, Três Lagoas (Exp. Depto. Zool.); MT: Barão de Melgão (W. F. Buren); Píruva, 15 km N I. de Taíamã (C. R. F. Brandão); Sto. Antônio (c.u.); Utiariti, Rio Papagaio, 325 m (K. Lenko); PA: Belém (W. F. Buren; C. R. Gonçalves); Cach. Cajú (Sampaio); Igarapé-Açu (c.u.); Soure (c.u.); PE: Olinda (Reichensperger); RD: Porto Velho (C. R. Gonçalves); RN: Ceará-Mirim (W. M. Mann); RR: Boa Vista (C. R. Gonçalves); SP: Faz. Itaquêrê, Boa Esperança do Sul (K. Lenko); Faz. Itaquêrê, Nova Europa (K. Lenko).

COLOMBIA *Guajira*: Maicao (W. L. Brown & C. Kugler); Serranía de Macuira, 6–8 km S Nazareth (W. L. Brown & C. Kugler); *Huila*: 10 km. SE Hobo (W. & E. MacKay); 12 km. S Neiva (W. & E. MacKay); 8 km. S Neiva (W. & E. MacKay); Colombia (W. & E. MacKay); *Magdalena*: 5 km SE Rio Frio, 100 m (P. S. Ward); Arroyo de Arena (F. M. Gaige); Gairaca, Parque Tayrona (C. Kugler); Rio Frio (Darlington); Rio Frio, 20 m (P. S. Ward); Santa Marta, 40 m (P. S. Ward); *Meta*: Carimagua, 370 m (M. Corn); El Castillo (W. & E. MacKay); *Tolima*: Ibagué (W. & E. MacKay).

CURAÇAO "Curacao" (Bugnion); Damacar (J. Maldonado C.).

ECUADOR *prov. unknown*: Limon Cocha & vic. (H. R. Hermann).

FRENCH GUIANA Cayenne (Pillault); Roura (G. H. Perrault).

GUADELOUPE no locality specified (A. Bonfils).

GUYANA *Mazaruni-Potaro*: Forest Settlement, R. Mazaruni (N. A. Weber); Kartabo, Bartica Dist. (W. M. Wheeler); *Rupununi*: Dadanawa, 100 m (J. T. Longino); Karanambo, 100 m (J. T. Longino).

PANAMA *Canal Zone*: 5 km WNW Gatun Dam, 160 m (P. S. Ward); Frijoles (W. M. Wheeler); vic. Pta de los Chivos, 3 km SW Gatun, 100 m (W. L. Brown *et al.*); *Coclé*: La Negrita, nr. Penonomé (D. Cordero); *Colón*: Colón (E. Adams); *Panamá*: Las Cumbres (M. Daykin); Matías Hernández (N. L. H. Krauss); Río Piedras (D. H. Janzen).

PERU *Hudnuco*: Monson Valley, Tingo María (E. I. Schlinger & E. S. Ross); Panguana, 220 m (M. Verhaagh); *Madre de Dios*: 30 km SW Pto. Maldonado, 290 m (T. L. Erwin *et al.*); *San Martín*: 24 km NNE Tarapoto, 220 m (P. S. Ward); Convento, 26 km NNE Tarapoto, 220 m (P. S. Ward); La Perla, 21 km NNE Tarapoto, 220 m (P. S. Ward); Tarapoto, 350 m (P. S. Ward).

ST. VINCENT Layou, St. Vincent (J. F. Lynch); Leeward side, St. Vincent (H. H. Smith); St. Vincent (c.u.).

TRINIDAD "Trinidad" (A. Forel; N. A. Weber; c.u.); Curepe (F. D. Bennett); Imp. Coll. Trop. Agr. (R. D. Shenefelt); Mayaro Bay (N. A. Weber); Nariva Swamp (N. A. Weber); St. Augustine (N. A. Weber).

VENEZUELA *Anzoátegui*: La Leona (H. Romero); *Aragua*: El Limón, 450 m (C. J. Rosales); Maracay, 450 m (P. S. Ward); *Barinas*: 17 km SSW Ciudad Bolívar, 240 m (L. Latke; P. S. Ward); *Bolívar*: Cuidad Bolívar (E. A. Klages); Río Cuyuni, 66 km SSE El Dorado, 250 m (P. S. Ward); *Dto. Federal*: Camuri Grande, Pica "La Guardia" (A. Escalante); Caracas (N. A. Weber); Valle Camuri Grande, nr. La Guaira, 70 m (I. Massin); *Gudricó*: Altigracia de Orituco (C. R. F. Brandão & L.O. Campos; illegible); Est. Exp. Los Llanos, 27 km S Calabozo (C. R. F. Brandão); Hato Masaguaral (Y. D. Lubin); *Miranda*: Higuerote (K. Jaffé; G. Villegas); *Monagas*: Estación Uverito (H. Romero); Uverito (C. J. Rosales & J. A. Gonzales); *Portuguesa*: El Oso (H. Romero); *Yaracuy*: San Felipe, El Peñón (C. Fuentes); *Zulia*: El Tucuco, Perija (R. W. Brook *et al.*); Maracaibo (E. Poirier; R. G. Wesson); *state unknown*: Akuriman (Anduze).

Pseudomyrmex eduardi (Forel)

(Figures 16, 17, 25)

Pseudomyrma eduardi Forel, 1912:29. Holotype (unique syntype) worker, Kingston, Jamaica (Forel) (MHNG) [Examined].

Worker measurements ($n = 11$).— HL 0.74–0.80, HW 0.50–0.57, MFC 0.009–0.018, CI 0.67–0.72, OI 0.53–0.59, REL 0.52–0.55, REL2 0.74–0.79, OOI 0.28–0.70, VI 0.79–0.86, FCI 0.017–0.032, SI 0.43–0.47, SI2 0.55–0.62, FI 0.46–0.53, PDI 0.93–1.31, MPI 0.039–0.073, NI 0.52–0.64, PLI 0.79–0.92, PWI 0.62–0.72, PPWI 1.19–1.50.

Worker diagnosis.— Similar to *P. caeciliae* (q.v.) in size, shape, and color; differing in sculpture—head largely smooth and shining, with scattered fine punctures (Fig. 25) which become coarser (but still somewhat effaced) in the region posterior to the compound eye; the punctulate-coriarious sculpture of the mesosoma is also somewhat effaced, producing rather strongly shining areas in the centre of the mesosoma dorsum and on the side of the propodeum; petiole, postpetiole, and gaster with a shinier appearance than in *P. caeciliae*, although still covered with moderately dense pubescence. Dark brown, the mandibles and tarsi lighter. Clypeus as in Figs. 16 and 17.

Comments.— This species is easily recognized by its combination of small size (HW <0.58), dark color, and smooth shiny appearance (especially on the head and mesosoma dorsum). The sculpture in the middle of the head between the compound eyes is particularly characteristic, consisting of very fine punctures and a few slightly coarser ones. All other species in the *P. oculatus* group have denser, coarser punctate sculpture on this part of the head.

Biology.— I collected colonies of *P. eduardi* in dead twigs of *Conocarpus erectus* and *Avicennia germinans* in mangrove in Venezuela. Other biological collection data include: in tree fall, wet forest (Costa Rica), dead stem of beach tree (Manaus, Brazil), in rain forest (Huánuco, Peru).

Material examined (CKIC, FFIC, INPA, IZAV, JTLC, KWJC, LACM, MCZC, MHNG, MNHN, MZSP, PSWC, USNM, WPMC, WWBC).—

BOLIVIA *Beni*: Cavinass (W. M. Mann); *La Paz*: Lower Rio Madidi (W. M. Mann); *Pando*: Abuna (W. M. Mann).

BRAZIL *AM*: Praia Grande, Rio Negro, Manaus (W. W. Benson); Rio Tarumá Mirim-Igapó (J. Adis); Tarumá-Mirim (J. Adis); km. 27, ZF-3, near Manaus (W. W. Benson); *MS*: Imbirussú-Corumbá (K. Lenko); *PA*: Tucuruí (R. B. Neto; W. L. Overal); *RD*: "Jl-Paraná/Gleba G. II-Perdida" (J. Arias).

COLOMBIA *Cauca*: Popayán (W. & E. MacKay); *Cundinamarca*: Medina (F. Fernández); *Magdalena*: Gairaca, Parque Tayrona (C. Kugler); *Meta*: Carimagua, 370 m (M. Corn); Villavicencio (W. & E. MacKay).

COSTA RICA "Costa Rica" (P. Serre); *Heredia*: 3 km S Pto. Viejo, 50 m (J. T. Longino).

JAMAICA Kingston (A. Forel); St. Eliz., Pedro Cross, 230 m (J. T. Longino); St. James, Porto Bello, 75 m (J. T. Longino); Trelawny, Green Park, 0–150 m (J. T. Longino).

PANAMA *Panamá*: Matías Hernández (N. L. H. Krauss).

PERU *Huánuco*: Panguana, 220 m (M. Verhaagh).

VENEZUELA *Anzoátegui*: 1 km S El Hatillo, <5 m (P. S. Ward); *Aragua*: El Limón, 480 m (C. J. Rosales); *Bolívar*: Ciudad Bolívar (N. A. Weber); *Cojedes*: Jabillal (H. Romero); *Dto. Federal*: Caracas, Jardín Botánica (G. Morillo); *Guárico*: Est. Exp. Los Llanos, 27 km S Calabozo (C. R. F. Brandão); *Sucre*: 2 km W Cumana (D. H. Janzen); nr. Cumana (D. H. Janzen); *T. F. Delta Amacuro*?: "Orinoco Delta" (N. A. Weber).

Pseudomyrmex elongatus (Mayr)

(Figures 6, 14, 15, 20, 21)

Pseudomyrma elongata Mayr, 1870:413. Syntype worker, S. Fe de Bogota, Colombia (Schauauss) (NHMV) [Examined]; here designated as LECTOTYPE.

Pseudomyrma elongata var. *tandem* Forel, 1906:228. Syntype workers, El Hiquito, near San Mateo, Costa Rica (P. Biolley) (MHNG) [Examined] [Synonymy by Creighton, 1955: 18; here confirmed].

Pseudomyrma allidiorae Wheeler, 1942: 157. Syntype workers, queen, Ancon, Canal Zone, Panama (W. M. Wheeler) (LACM, MCZC) [Examined]. One syntype worker in MCZC here designated LECTOTYPE. *Syn. nov.*

Pseudomyrma allidiorae Enzmann, 1945:77. Syntype workers, queen, Ancon, Canal Zone, Panama (W. M. Wheeler) (LACM, MCZC) [Examined] [Objective synonym of *P. allidiorae* Wheeler; Brown, 1949:42]

Worker measurements ($n=55$).— HL 0.73–0.93, HW 0.56–0.68, MFC 0.011–0.027, CI 0.66–0.79, OI 0.50–0.59, REL 0.53–0.59, REL2 0.73–0.82, OOI 0.04–0.67, VI 0.75–0.90, FCI 0.019–0.047, SI 0.42–0.48, SI2 0.54–0.63, FI 0.43–0.56, PDI 1.06–1.44, MPI 0.032–0.070, NI 0.54–0.65, PLI 0.79–1.09, PWI 0.62–0.87, PPWI 1.09–1.48.

Worker diagnosis.— Similar to *P. caeciliae* (q.v.), but averaging larger in size with longer eyes in relation to head length (Fig. 6; compare HW, HL, and REL); ocellar distance variable (OD/HW 0.097–0.165). Clypeus as in Figs. 14 and 15. Basal face of propodeum tending to be less elevated above level of mesonotum (compared to *P. caeciliae*) and usually meeting the declivitous face at a sharper angle. Head densely punctate and predominantly opaque; punctures on upper half of head mostly contiguous, separated by half their diameters or less (except for a thin shiny margin about 0.010 to 0.020 mm wide immediately posterior to the compound eye). Mesosoma punctate to coriarius-imbricate, the central areas more heavily sculptured and less shiny than in *P. caeciliae*.

Comments.— *P. elongatus* is a common and widespread species whose key features are its relatively small size (HW 0.56–0.68); densely punctate and

predominantly opaque head; long eyes ($REL \geq 0.53$, $REL2 \geq 0.73$); and relatively short, high petiole ($PLI \geq 0.79$). Distinctions between it and *P. caeciliae*, *P. cubaensis*, and *P. urbanus* are discussed under those species.

I found the type worker of *P. elongatus*, which had previously eluded discovery (Ward, 1985), during a visit to NHMV. It had been misplaced under *Pseudomyrmex elongatulus* (Dalle Torre), a replacement name for the preoccupied *P. elongatus* (F. Smith, 1877), which is a markedly different species (see Kempf, 1967).

Biology.—This species is a generalist inhabitant of dead twigs of woody plants. It has been collected in mangroves, old fields, along roadsides, and in forested habitats ranging from tropical dry forest to secondary and primary rain forest. Specific nest-site records include dead twigs of *Avicennia germinans*, *Rhizophora mangle*, *Laguncularia racemosa*, *Baccharis halimifolia*, *Baccharis trinervis*, *Baccharis* sp., *Ficus* spp., *Vernonia patens*, *Terminalia catappa*, *Tecoma stans*, *Zanthoxylum culantrillo*, *Gliricidia sepium*, *Inga* sp., *Helicteres* sp., *Coccoloba* sp., and *Sapium* sp. Also I collected a colony in a live branch of *Pithecellobium saman*, and there are records from (apparently live) stems of *Cecropia*, *Cordia alliodora*, and *Triplaris cumingiana*. Thus, it appears that *P. elongatus* will occupy ant-plant domatia opportunistically.

Material examined (BMNH, CASC, CDAE, CELM, CNCC, CUIC, EBCC, FFIC, GCWC, ICCM, INPA, IZAV, JTLG, KWJC, LACM, MCSN, MCZC, MHNG, MZSP, NHMB, NHMV, PSWC, UCDC, USNM, UWEM, WPMC, WWBC).—

BELIZE El Cayo (N. L. H. Krauss).

BOLIVIA Beni: 46 km SSW San Borja, 300 m (P. S. Ward); Est. Biol. Beni, 42 km E San Borja, 210 m (P. S. Ward); Huachi (W. M. Mann); Reyes (W. M. Mann); La Paz: Espia Rio Bopi (W. M. Mann); Sta. Helena (W. M. Mann).

BRAZIL AC: Porto Valter (P. L. Herbst); AM: Arquipelago d. Anavilhanas, Rio Negro (c.u.); Faz. Dimona, 80 km N Manaus, 80 m (P. S. Ward); High Falls, Rio Taruma (W. L. Brown); Ig. Marianil, Rio Branco Rd., 24 km NE Manaus (W. L. Brown); Manaus (C. R. Gonçalves; c.u.); Manaus, 60 m (P. S. Ward); Manaus-AM010, km. 10 (A. Y. Harada); Praia Grande, Rio Negro, Manaus (W. W. Benson); Reserva Ducke (J. A. Rafael); Reserva Ducke, NE of Manaus (W. L. Brown); Rio Tarumá Mirim-Igapó (J. Adis); Tarumá-Mirim (J. Adis); km. 24, ZF-3, near Manaus (W. W. Benson); km. 27, ZF-3, near Manaus (W. W. Benson); BA: Salvador (N. L. H. Krauss); ES: Linhares (M. Alvarenga); GO: Araguacema (J. A. Rafael); Jataí (F. M. Oliveira); MA: Bacabal (W. W. Kempf); MG: Pedra Azul, 800 m. (Seabra & Alvarenga); MS: Faz. Canaã, Três: Lagoas (F. Lane); Faz. Floresta, Mun. Três: Lagoas (Exp. Depto. Zool.); Imbirassú-Corumbá (K. Lenko); Ladário (Gilbert & Müller); Serra do Urucum, Corumbá (K. Lenko); Três Lagoas (Exp. Depto. Zool.; K. Lenko); MT: Sinop (Alvarenga & Roppa; M. Alvarenga); MT?: "Matto Grosso" (German); PA: Belém (P. Vanzolini; c.u.); Belém-Tapaná (A. Y. Harada); C. Araguaia (A. Y. Harada); J. A. Rafael; C. Araguaia, Campo Gramado (A. Y. Harada); Cach. (do) Breu (Sampaio); Igarapé-Açu (c.u.); Oriximiná, Alcoa Miner. M. Branco (A. Y. Harada); Oriximiná-Rio Trombetas, Alcoa Miner. Campina (A. Y. Harada); Sa. dos Carajás (25 km W Camp N-1) (W. W. Benson); Santarém, Taperinha (R. L. Jeanne); Tucuruí (R. B. Neto; W. L. Overal); Utinga track, nr. Belém (K. Lenko); PE: Tapera (B. Pickel); RD: Porto Velho (C. R. Gonçalves); Vilhena (M. Alvarenga); RJ: Cabo Frio (C. Gilbert); Fonseca, Niterói (C. R. Gonçalves); Guaratiba (A. Silva); I. Governador (C. R. Gonçalves); Marambaia (R. Müller); Rio de Janeiro, Taquara (T. Borgmeier); São Bento (P. A. Telles); "Guanabara dos Bandeirantes" (N. L. H. Krauss); SP: Adolfo ("P. de preia Rio Tietê") (M. Dimiz); Agudos (C. Gilbert; R. Müller); Anhembi, Faz. Barr. Rico (W. W. Kempf *et al.*); Barabosa-Tietê (J. Diniz [= missp. of M. Dimiz?]); Cachoeira das Emas (EEBP), Mun. Piracununga (W. L. Brown); Campinas (W. W. Benson); Faz. Itaqueiré, Nova Europa (K. Lenko); Franca (c.u.); S. Sebastião (Fleddermann; W. W. Kempf); Ubatuba (P. C. Montouchet); state unknown: Chapada (c.u.).

COLOMBIA *Boltvar*: Cartagena (c.u.); *Cauca*: 15 mi. S Corinto, 1140 m (E. I. Schlinger & E. S. Ross); *Cundinamarca*: "S. Fe de Bogota" (Schaufuss); Anapoima (I. Zenner); El Colegio & Anapoima (I. Zenner); *Guajira*: Puente Bomba, nr. Dibulla (W. L. & D. E. Brown); Rio Don Diego (C. Kugler & W. L. Brown); *Serrania de Macuira*, W. of Nazareth (C. Kugler & W. L. Brown); *Huila*: 10 km S Campolegre (W. & E. MacKay); 10 km SE Hobo (W. & E. MacKay); 10 km, W Palermo (W. & E. MacKay); 1 km S Neiva (W. & E. MacKay); 4 km, S Tello (W. & E. MacKay); Colombia (W. & E. MacKay); La Plata (W. & E. MacKay); Palermo (W. & E. MacKay); *Magdalena*: 2 km E Orihueca, 20 m (P. S. Ward); 2 km ESE Minca, 780 m (P. S. Ward); 5 km SE Rio Frio, 100 m (P. S. Ward); Bahia de Gairaca, Tayrona Pk, 20 km NE Santa Marta (H.-G. Müller); Cañaveral, 50 m (P. S. Ward); Cañaveral, 5 m (P. S. Ward); Cañaveral, <5 m (P. S. Ward); Digreña, base of mts. nr. Santa Marta (C. Kugler & W. L. Brown); Minca (W. L. Brown); Rio Frio (Darlington); Rio Frio, 20 m (P. S. Ward); Villa Culebra, nr. Bonda, 10 km E Sta. Marta (H.-G. Müller); *Magdalena*?: locality illegible (A. Forel); *Meta*: Reserva Macarena, 560 m (F. Fernández); Reserva Macarena, Caño La Curia, 580 m (F. Fernández); *Valle*: 6 km S Univ. Valle (W. L. Brown); Cali (N. L. H. Krauss); Cali, in quarantine at San Francisco (c.u.); Dagua (W. & E. MacKay).

COSTA RICA "Costa Rica" (Alfaro; P. Biolley); *Alajuela*: 11 mi. N Florencia (D. H. Janzen); El Hiquito near San Mateo, 250 m (P. Biolley); *Guanacaste*: 1 km SW Pto. Coyote, <5 m (P. S. Ward); 4 km N Cañas (D. H. Janzen); *Heredia*: 10°20'N, 84°04'W, 500 m (J. T. Longino); 3 km S Pto. Viejo, 50 m (J. T. Longino); F. La Selva, 3 km S Pto. Viejo (H. A. Hespender); Finca La Selva (D. H. Janzen); *Limón*: La Lola (D. H. Janzen; M. J. Stelzer; N. A. Weber); Zent (F. Lara); *Puntarenas*: 14 km E Palmar Norte, 120 m (P. S. Ward); 14 km E Palmar Norte, 70 m (P. S. Ward); 1 km NE Tárcoles, 20 m (P. S. Ward); 5 km N Ciudad Neily, 780 m (P. S. Ward); Golfito, 5 m (P. S. Ward); Guaría, 700 m (J. T. Longino); Llorona, Corcovado Natl. Pk. (J. T. Longino); Llorona, Corcovado Natl. Pk., 10 m (P. S. Ward); Manuel Antonio Natl. Pk., 5 m (P. S. Ward); Manuel Antonio Natl. Pk., <5 m (P. S. Ward); Monteverde, 1100 m (P. S. Ward); Monteverde, 1200 m (P. S. Ward); Osa Penin., Corcovado Natl. Pk. (J. T. Longino); Palmar Sur (D. H. Janzen); Reserva Biol. Carara, 10 m (P. S. Ward); Reserva Biol. Carara, 500 m (P. S. Ward); Sirena, Corcovado Natl. Pk. (J. T. Longino); *San José*: 3.5 km NE Santiago de Pur (D. H. Janzen); 40 km S San Isidro de General (D. H. Janzen).

ECUADOR *Manabí*: Puna Island (Ross & Michelbacher); *Pichincha*: 6 mi W Santo Domingo de los Colorados (E. I. Schlinger & E. S. Ross).

EL SALVADOR San Salvador (N. L. H. Krauss); Santa Anna (N. L. H. Krauss).

GUATEMALA "Guatemala", quarantine San Francisco (c.u.); *Escuintla*: Escuintla (W. M. Wheeler); *Escuintla*?: San José (E. S. Ross; E. I. Schlinger & E. S. Ross); *Guatemala*: Guatemala City, quarantine San Francisco (c.u.); *Petén*: Tikal (N. L. H. Krauss); *Retalhuleu*: 1.3 mi E Champerico (D. H. Janzen); 5 mi W Retalhuleu, Hwy. CA-2, at Rio Nil (D. H. Janzen).

GUYANA *Mazaruni-Potaro*: Kartabo, Bartica Dist. (W. M. Wheeler); *North West*: Wauna & Tokomabu (J. G. Myers); *Rupununi*: Dadanawa, 100 m (J. T. Longino).

MEXICO *Is. Tres Marias*: Maria Magdalena I. (H. H. Keifer; R. R. Snelling); *Jal.*: 14 km SSE Chamela, 20 m (P. S. Ward); 2 km E Chamela, 20 m (P. S. Ward); 32.8 mi. SW Atlán (D. H. Janzen); 6 km NW El Tuito, 560 m (P. S. Ward); *Mor.*: Cocoyotla, munic. Coatlán del Rio, 1120 m (G. Alemán); Cuzuhuatlán (G. Alemán); Los Alcanfores, Mpo. Xochitepec (G. Alemán); Tetecala, 800 m (G. Alemán); *Oax.*: 19 km N San Pedro Pochutla, 200 m (W. P. MacKay); *S.L.P.*: Rio Amahac, Tamazunchale, 300 ft. (W. S. Creighton); Tamazunchale (W. S. Ross); *Sin.*: 4.6 mi E Chupaderos (E. I. Schlinger); *Ver.*: Cotaxtla Exp. Sta, Cotaxtla (D. H. Janzen); *Yuc.*: 11 km S Progreso (E. O. Wilson).

NICARAGUA *Matagalpa*: El Tuma, 30 km E Matagalpa (C. Kugler & J. Hahn).

PANAMA *Bocas del Toro*: Changuinola Dist. (G. C. Wheeler); *Canal Zone*: 2 km W Gamboa, 30 m (P. S. Ward); 5 km WNW Gatun Dam, 160 m (P. S. Ward); 6 km NW Gamboa, 50 m (P. S. Ward); 6 km NW Gatun Dam, 75 m (P. S. Ward); Ancon (W. M. Wheeler); Barro Colorado I. (W. L. Brown & E. S. McCluskey; H. Wolda; G. C. Wheeler; J. Zetek); Cerro Galera, 9 km W Panama City, 200 m (W. L. Brown *et al.*); Chiva Chiva (N. L. H. Krauss); Fort Sherman, Island P2 (D. Simberloff); Frijoles (G. C. Wheeler; W. M. Wheeler); Miraflores (W. M. Wheeler); Ruta 1, 14 km W Panama City, 100 m (W. L. Brown *et al.*); Ruta 1, Howard AFB, W of Panama City, 50 m (W. L. Brown *et al.*); vic. Pta de los Chivos, 3 km SW Gatun, 100 m (W. L. Brown *et al.*); *Chiriquí*: "Prov. Chiriquí" (F. M. Gaige); 10.7 mi ESE La Concepción (D. H. Janzen); *Colón*: Colón (E. Adams); *Panamá*: Bella Vista (W. M. Wheeler); Cerro Azul, 800 m (E. Mockford); Isla San José, Islas Perlas (C. Campbell); Matías Hernández (N. L. H. Krauss); Pueblo Nuevo (W. M. Wheeler); Rio Piedras (D. H. Janzen); *Veraguas*: 0.3 mi SW Santiago (D. H. Janzen); *prov. unknown*: "Lilihe R" (W. M. Wheeler).

PERU *Madre de Dios*: 30 km SW Pto. Maldonado, 290 m (T. L. Erwin *et al.*); Cocha Cachu, Rio Manu (D. Hunt); *San Martín*: Convento, 26 km NNE Tarapoto, 220 m (P. S. Ward); La Perla, 21 km NNE Tarapoto, 220 m (P. S. Ward); Tarapoto, 350 m (P. S. Ward).

TRINIDAD Maracas Valley (N. A. Weber).

UNITED STATES *Florida*: *Collier Co.*: 6 mi S Naples (G. S. Walley); Everglade[s] (W. T. Davis); *Dade Co.*: no specific locality (J. N. Knull); Coconut Grove (c.u.); Miami (c.u.); Miami, 10 m (P. S. Ward); Rattlesnake Hammock, Homestead (R. Gregg); Shark Valley, Everglades Natl. Pk. (P. S. Ward); *Highlands Co.*: Archbold Biol. Stn., L. Placid (T. C. Schneirla); *Lee Co.*: Ft. Myers (W. M. Barrows; D. E. Read); *Monroe Co.*: Big Pine Key (E. O. Wilson); John Pennkamp St. Pk., <5 m (P. S. Ward); Key Largo (A. Wetmore; c.u.); Key West (E. A. Schwartz); Lower Matecumbe Key (J. R. Vockeroth); N. Key Largo (R. W. Klein); Plantation Key (E. O. Wilson).

VENEZUELA "Venezuela", in quarantine at San Francisco (c.u.); *Aragua*: El Limón, 450 m (C. J. Rosales); El Limón, 480 m (C. J. Rosales); *Barinas*: 17 km SSW Ciudad Bolívar, 240 m (P. S. Ward); 17 km SW Ciudad Bolívar, 240 m (P. S. Ward); *Bolívar*: 49 km ENE Tumeremo, 200 m (P. S. Ward); *Carabobo*: Puerto Cabello (W. L. Brown); *Cojedes*: 20 km W San Carlos (W. L. Brown); *Dto. Federal*: La Pastora, Caracas (c.u.); La Trinidad, Caracas (M. E. Lopez); *Güdrich*: Altigracia de Orituco (C. R. F. Brandão & L. O. Campos); Hato Masagual (Y. D. Lubin); *Merida*: Merida (A. S. Menke & D. Vincent); *T. F. Amazonas*: P. N. Duida-Marahuaka, Culebra, 250 m (K. Jaffé); *T. F. Delta Amacuro*: Palo Blanco (H. Romero); *T. F. Delta Amacuro*?: "Orinoco Delta" (N. A. Weber); *Trujillo*: 19 km E Boconó, 600 m (J. T. Longino; P. S. Ward); *Zulia*: El Tucucú, Perija (R. W. Brooks *et al.*).

Pseudomyrmex oculatus (F. Smith)

(Figure 7)

Pseudomyrma oculata Smith, 1855:159. Two syntype worker, Santarém, Brazil (Bates) (BMNH) [Examined]. One syntype worker here designated LECTOTYPE.

Pseudomyrma advena F. Smith, 1855:157. [Objective synonym of *P. oculatus*; Forel, 1911:277. See discussion by Forel (1911) and Kempf (1961)].

Pseudomyrma dolichopsis Forel, 1899:87. Syntype workers, Sucre, Jimenez, Costa Rica (Alfaro) (MHNG, MCSN) [Examined] [Synonymy by Kempf, 1961:375; here confirmed].

Pseudomyrma dolichopsis var. *implicata* Forel, 1911:277. Two syntype workers, Amazonas (Bates) (MHNG) [Examined] [Synonymy by Kempf, 1961:375; here confirmed]. One syntype worker here designated LECTOTYPE (see comments below).

Pseudomyrma sericea var. *altinoda* Mann, 1916:427. Syntype workers Porto Velho, Rio Madeira, Brazil (Mann & Baker) (MCZC) [Examined] *Syn. nov.*

Pseudomyrma wessoni Enzmann, 1945:97. Syntype queen, Peru, (MCZC) [Examined] *Syn. nov.*

Pseudomyrma wessoni var. *tuberculata* Enzmann, 1945:98. Holotype worker, Peru [Not examined] *Syn. nov.*

Pseudomyrmex oculatus (F. Smith); Kempf, 1961:375 [Redescription of worker and queen].

Worker measurements ($n=24$).— HL 0.94–1.09, HW 0.73–0.91, MFC 0.017–0.031, CI 0.77–0.87, OI 0.57–0.61, REL 0.55–0.62, REL2 0.67–0.78, OOI (–0.20)–0.37, VI 0.72–0.81, FCI 0.021–0.037, SI 0.46–0.50, SI2 0.62–0.72, FI 0.40–0.44, PDI 0.97–1.40, MPI 0.032–0.056, NI 0.72–0.81, PLI 0.86–1.01, PWI 0.66–0.82, PPWI 1.35–1.61.

Worker diagnosis.— Medium to large species, for the *oculatus* group (HW 0.73–0.91), with broad head (CI 0.77–0.87) and with large, elongate eyes which tend to protrude conspicuously from the sides of the head and which typically (but not always) reach the level of the median ocellus, when head is held in full-face view; occipital margin flat to moderately concave; funicular segments II and III about as long as broad, or nearly so. Fore femur relatively slender (FI 0.40–0.44); metanotal groove moderately impressed; basal face of propodeum flat to weakly convex (lateral view), conspicuously elevated anteriorly above level of mesonotum; basal face of propodeum usually exceeding length of the declivitous face and rounding into the latter, which is laterally submarginate. Petiolar node (Fig. 7) high and subangulate, with distinctive lateral profile: anterior face smoothly continuous with the flattened, posteriorly uplifted dorsal face which itself rounds sharply into the vertical posterior face; anteroventral petiolar process conspicuous, variable in shape (from bluntly rounded to slightly recurved and hook-like); postpetiole broader than long, in lateral view appearing rather high, with the convex, gradually ascending anterodorsal face rounding into a more

steeply descending posterior face.

Head densely punctate and typically opaque; becoming sublucid on upper third of head in some individuals, because of shiny interspaces between some of the punctures. Mesosoma punctate to coriarius-imbricate and predominately opaque; petiole, postpetiole, and gaster subopaque, covered with numerous fine piligerous punctures. Erect pilosity and appressed pubescence common on most of body, including mesosoma dorsum. Medium to dark brown, the antennae, tibiae, and tarsi variably lighter, often contrastingly so; pronotum and parts of head sometimes lighter in color than gaster; mandibles pale luteous.

Comments.— This common, widely distributed species shows considerable geographical variation (particularly in size, sculpture, color, and head shape), but it is at once recognizable by the distinctive shape of the petiolar node. The sudden, subangulate juncture of the dorsal and posterior faces of the node (Fig. 7) is seen in no other related species. Also characteristic of *P. oculatus* are the elongate eyes (see REL and REL2 values), relatively broad head, the (typically) punctate-opaque sculpture of the head, and the shape of the postpetiole in lateral view (summit of postpetiolar node displaced posteriorly relative to other species in the *P. oculatus* group, except *P. schuppi*).

Lectotypes of both *P. oculatus* and *P. implicatus* are designated because the apparent type series of these taxa contain more than one species. In the BMNH, under *P. oculatus*, I found three species: (1) two syntype workers of what is here interpreted to be *P. oculatus*, from Santarem, Brazil; (2) an alate queen of *P. peperi* (Forel), a Central American acacia-ant labelled (obviously erroneously) "Santarem"; and (3) four workers of *P. filiformis*, two of which (from Villanova, Brazil) were labelled as types of *P. oculatus*. The type series of *P. implicatus* in MHNG contains two species: (1) two workers of *P. oculatus*; and (2) one worker of *P. curacaensis*. For nomenclatural stability I have chosen as lectotypes of *P. oculatus* and *P. implicatus* those workers which correspond to the species described (at least as a queen) and illustrated (as a worker, under the name *P. advena*) by F. Smith (1855). The choice of lectotypes is also consistent with Kempf's (1961) concept of *P. oculatus*, which was based on an examination of material in the Hope Collection, Oxford (OXUM) which Kempf considered to represent part of the type series of *P. oculatus*.

The syntype queen of *P. wessoni* (Enzmann) is clearly conspecific with *P. oculatus*. Unfortunately, the type of *P. wessoni tuberculatus* (Enzmann) cannot be located, and second-guessing the identity of Enzmann's creations is an unsatisfying task. Nevertheless there are enough features of the original description (broad head; large eyes; densely punctate, opaque head; petiolar profile similar to that of *P. wessoni*) to support synonymy under *P. oculatus*.

Biology.— *P. oculatus* is typically found nesting in dead twigs or branches, in rain forest or at the edge of rain forest, less frequently in open or drier habitats. Specific nest-site records include dead twigs of *Ficus*, *Hampea*, *Inga*, *Vochysia*, and various unidentified lianas; I found one colony in the dead leaf sheath of a *Scheelea* palm.

Material examined (BMNH, CASC, CNCC, CUIC, FFIC, GCWC, GHPC, ICCM, INPA, JTLC, KSUC, LACM, MCSN, MCZC, MHNG, MZSP, PSWC, UCDC, USNM, UWEM, WWBC).—

BELIZE Belize (c.u.); San Ignacio, Cayo, 60 m (S. E. Schoenig); Manatee (J. D. Johnson).

BOLIVIA Beni: 45 km SSW San Borja, 270 m (P. S. Ward); 46 km SSW San Borja, 300 m (P. S. Ward); Cavinás (W. M. Mann); Est. Biol. Beni, 42 km E San Borja, 210 m (P. S. Ward); Ivon (W. M. Mann); La Paz: Covendo (W. M. Mann); Ixiámas (W. M. Mann); Sta. Helena (W. M. Mann).

BRAZIL AC: Rio Branco (M. Alvarenga); AM: "Amazonas" (Bates); "Faz. NAFG, Est. Mr. Carac. km. 31" (c.u.); Arquipelago Anavilhanas, Rio Negro (R. Negrett); Benjamin Constant & vicinity (W. L. Brown); Cucuí, Ponto 08 (D. Dias); E.E.S.T., km. 44, BR-174, [near] Manaus (c.u.); Faz. Dimona, 80 km N Manaus, 80 m (P. S. Ward); Faz. Esteio, 80 km NNE Manaus, 80 m (P. S. Ward); Humaita (P. da Silva & D. Araújo); Ig. Jaraquí, Marg. esq., Rio Negro (Exp. Depto. Zool.); Ig. Marianil, Rio Branco Rd., 24 km NE Manaus (W. L. Brown); Manaus (A. Y. Harada; K. Lenko); Manaus-Caracará, km. 61 (W. W. Benson); Praia Grande, Rio Negro, Manaus (W. W. Benson); Reserva Ducke, NE of Manaus (W. L. Brown); Rio Turuma Mirim-Igapó (J. Adis); km. 24, ZF-3, Faz. Esteio, near Manaus (A. Y. Harada); km. 24, ZF-3, near Manaus (W. W. Benson); A. Y. Harada; km. 27, ZF-3, near Manaus (W. W. Benson); km. 44, BR-174, near Manaus (W. W. Benson); km. 44.5, BR-174, near Manaus (W. W. Benson); BA: Una (M. C. Alves); ES: Linhares (M. Alvarenga); GO: Araguacema (A. Y. Harada; J. A. Rafael); Jataí (F. M. Oliveira); MT: Barra do Tapirapé (B. Malkin); Sinop (Alvarenga & Roppa; M. Alvarenga); Utiariti, Rio Papagaio, 325 m (Lenko & Pereira); Vila Vera (M. Alvarenga); Xingu (Alvarenga & Werner); PA: "Pará" (Schulz.); Belém (K. Lenko; N. Rosa); Belém-Tapaná (A. Y. Harada); C. Araguaia (A. Y. Harada; J. A. Rafael); Cach. Breu (Sampaio); Caldeirão, R. Itacaiunas (C. R. F. Brandão & W. W. Benson); Jacaracanga (M. Alvarenga); Oriximiná (A. Y. Harada); Oriximiná, Alcoa C. Alta (A. Y. Harada); S. Norte, Carajás (C. R. F. Brandão & W. W. Benson); Sa. dos Carajás (W. W. Benson); Santarém (Bates); Tucuruí (W. L. Overall); Utinga tract, nr. Belém (P. F. Darlington); RD: Porto Velho (J. Arfás); Porto Velho, Rio Madeira (W. M. Mann & Baker); Rio Madeira, Madeira-Mamore R. R. Co. Camp 39 (W. M. Mann & Baker); S. Antonio de Guaporé (c.u.); Vilhena (M. Alvarenga; A. Y. Harada); RR: Rio Urucuí leha Manicá (R. Negrett).

COLOMBIA *Cundinamarca*: Medina (F. Fernández); *Magdalena*: 2 km ESE Minca, 780 m (P. S. Ward); Naranjo (A. Forel).

COSTA RICA "Costa Rica" (Tonduz); *Alajuela*: 11 mi N Florencia (D. H. Janzen); *Cartago*: Turrialba (D. H. Janzen); *Guanacaste*: 12 km N Liberia (D. H. Janzen); Finca Taboga, 6 mi. S, 6 mi. W Cañas (D. H. Janzen); *Heredia*: 10°20'N, 84°04'W, 500 m (J. T. Longino); F. La Selva, 3 km S Pto. Viejo (H. A. Hespenheide); P. N. Braulio Carrillo, 500 m (J. T. Longino); *Limón*: Estrella Valley (G. C. Wheeler); Hamburg-Farm, Santa Clara (F. Nevermann); Jiménez (Alfaro?); La Lola (N. A. Weber); Limón (N. L. H. Krauss); Matina (A. Alfaro); Moin (D. H. Janzen); Parismina Br., Santa Clara (F. Nevermann); Portete (D. H. Janzen); Suerre, Jiménez (Alfaro?); *Puntarenas*: 1 km NE Tárcoles, 20 m (P. S. Ward); 1 km N Palmar Sur (D. H. Janzen); 20 km NE Palmar Sur (D. H. Janzen); 1–5 mi. NW Rincon (D. H. Janzen); Golfito (W. S. Ross; Truxal & Menke); Llorona, Corcovado Natl. Pk., 100 m (P. S. Ward); Llorona, Corcovado Natl. Pk., 10 m (P. S. Ward); Llorona, Corcovado Natl. Pk. (J. T. Longino); Manuel Antonio Natl. Pk. (L. Masner); Manuel Antonio Natl. Pk., 10 m (P. S. Ward); Manuel Antonio Natl. Pk., 20 m (P. S. Ward); Manuel Antonio Natl. Pk., 5 m (P. S. Ward); Manuel Antonio Natl. Pk., <5 m (P. S. Ward); Reserva Biol. Carara, 40 m (P. S. Ward); Reserva Biol. Carara, 500 m (P. S. Ward); Sirena, Corcovado Natl. Pk. (J. T. Longino); Sirena, Corcovado Natl. Pk., 0–100 m (J. T. Longino); Sirena, Corcovado Natl. Pk., 50 m (J. T. Longino); *San José*: 3.5 km NE Santiago de Pur (D. H. Janzen); 40 km S San Isidro de General (D. H. Janzen).

ECUADOR *prov. unknown*: Piedrero (M. Deyrup).

FRENCH GUIANA Cayenne (Pillault); Saül (G. H. Perrault).

GUATEMALA *Alta Verapaz*: Cacao Trece Aguas (Barber & Schwarz); *Izabal*: Lago Izabal, 1.5 km NE El Estor (D. H. Janzen); *Suchitepéquez*: Moca (W. M. Wheeler).

GUYANA *East Demerara - West Coast Berbice*: Timehri, 0–50 m (J. T. Longino); *Mazaruni-Potaro*: Bartica (W. Beebe); Kartabo, Bartica Dist. (W. M. Wheeler); Oko R., Cuyuni trib. (N. A. Weber); *Rupununi*: Karanambu, 100 m (J. T. Longino); Tutwau V., 100–300 m (J. T. Longino).

HONDURAS *Atlántida*: La Ceiba (F. J. Dyer); Tela (W. M. Mann); *Colón*: Corocito (c.u.); *Cortés*: Lago Yojoa, 680 m (W. L. Brown).

MEXICO *Chis.*: 10 km S Palenque (M. Arrendondo); *Q. Roo*: San Miquel, Cozumel I. (N. L. H. Krauss); Vallarta (A. Dejean); *Tabasco*: 3 mi. W Cardenas (D. H. Janzen); *Ver.*: "St. Lucrecia, Teh." (W. M. Mann); 6 mi. NW Salinas (E. Schlinger); Los Tuxtlas (R. L. Jeanne); Los Tuxtlas, 10 km NNW Sontecomapan, 200 m (P. S. Ward); Los Tuxtlas, 10 km NNW Sontecomapan, 500 m (P. S. Ward).

NICARAGUA *Matagalpa*: El Tuma, 30 km E Matagalpa (C. Kugler & J. Hahn).

PANAMA *Canal Zone*: 3 km WNW Gamboa, 60 m (P. S. Ward); 5 km WNW Gatun Dam, 160 m (P. S. Ward); 6 km NW Gamboa, 50 m (P. S. Ward); Barro Colorado I. (N. Banks; W. L. Brown & E. S. McCluskey; H. Emerson; P. B. Kannowski, R. B. Root & W. L. Brown; R. B. & L. S. Kimsey; J. Reiskind; C. W. Rettenmeyer; W. M. Wheeler; H. Wolda; c.u.); Cerro Galera, 9 km W Panama City, 200 m (W. L. Brown *et al.*); Fort Kobbe (C. Campbell); Frijoles (W. M. Wheeler); Margarita Swamp (J. Zetek); Puma Island (R. B. Kimsey); vic. Pta de los Chivos, 3 km SW Gatun, 100 m (W. L. Brown *et al.*); Summit (N. L. H. Krauss); *Chiriqui*: Progreso (F. M. Gaige); *Darién*: Cana, 500 m (D. M. Olson); *Panamá*: Bella Vista (N. Banks); Cerro Campana, 800–950 m (G. B. Fairchild & W. L. Brown).

PERU "Peru" (c.u.); *Junin*: Chanchamayo, Anashirone R. (C. A. Portocarrero); El Campamiento, Col. Perené (J. C. Bradley); Satipo (W. F. Walsh); *Loreto*: 15 km WSW Yurimaguas, 200 m (P. S. Ward); Yurac, 67 mi E Tingo Maria (E. I. Schlinger & E. S. Ross); *Madre de Dios*: 30 km SW Pro. Maldonado, 290 m (T. L. Erwin *et al.*); *San Martín*: Convento, 26 km NNE Tarapoto, 220 m (P. S. Ward); Davidcillo, 30 km NNE Tarapoto, 220 m (P. S. Ward).

TRINIDAD "Trinidad" (N. A. Weber; c.u.); Nariva Swamp (N. A. Weber); Palo Seco (H. Morrison).

VENEZUELA *Barinas*: 17 km SSW Ciudad Bolivia, 240 m (P. S. Ward); *Bolívar*: 44 km ENE Tumeremo, 200 m (P. S. Ward); Campamento Rio Grande, 250 m (P. S. Ward); Rio Cuyuni, 66 km SSE El Dorado, 250 m (P. S. Ward); *Carabobo*: San Esteban (W. L. & D. E. Brown); *T. F. Delta Amacuro*?: "Orinico Delta" (N. A. Weber).

Pseudomyrmex pisinnus sp. nov.

(Figures 11a, 11b)

Holotype worker.— BRAZIL, *SP*: Monte Aprazível, Faz. Bacuri [20°45'S, 49°42'W], 19.vii.1974, in *Eupatorium* stem, M. Dimiz, no. 644 (MZSP). HW 0.51, HL 0.78, EL 0.41, PL 0.30, PH 0.22.

Paratypes.— Same data as holotype, four workers (LACM, MCZC, MZSP, PSWC). Additional, non-paratypic material is listed below.

Worker measurements ($n=8$).— HL 0.75–0.78, HW 0.47–0.51, MFC 0.009–0.016, CI 0.61–0.68, OI 0.49–0.55, REL 0.52–0.54, REL2 0.78–0.86, OOI 0.73–1.58, VI 0.76–0.87, FCI 0.018–0.033, SI 0.41–0.45, SI2 0.50–0.54, FI 0.46–0.52, PDI 1.46–1.69, MPI 0.029–0.047, NI 0.59–0.64, PLI 0.67–0.77, PWI 0.54–0.65, PPWI 1.07–1.20.

Worker diagnosis.— Very small species (HW 0.47–0.51) with elongate head (Fig. 11a; CI 0.61–0.68), and short scapes relative to eye length (SI2 0.50–0.54); sides of head subparallel; occipital margin flat to slightly concave, in frontal view; funicular segments II and III notably broader than long (FLI 1.16–1.48, $n=4$). Fore femur broad; metanotal groove rather weakly impressed; basal face of propodeum rounding into the much shorter declivitous face. Petiolar node (Fig. 11b) rather long and low, the dorsum broadly rounded in lateral profile (PLI 0.67–0.77); postpetiole about as broad as long.

Head sublucid, covered with numerous piligerous punctures; punctures relatively coarse but appearing somewhat effaced, and separated (at least on the upper half of the head) by shiny interspaces of one or more diameters' distance, especially in the region immediately posterior to the compound eye. Mesosoma weakly punctate to coriarius-imbriate, sublucid dorsally. Petiole, postpetiole, and gaster subopaque to sublucid, covered with numerous, fine piligerous punctures. Erect pilosity and appressed pubescence present on most of the body; erect hairs present on the pronotum, mesonotum and propodeum, but relatively short, sparse, and inconspicuous, except for one pair on the pronotal shoulders and a second pair above the juncture of the basal and declivitous faces of the propodeum. Body light orange-brown to yellow-brown, with darker infuscation on the anterior third of the first gastric (fourth abdominal) tergite, on the succeeding gastric tergites, and on part of the hind femur; mandibles paler luteous.

Comments.— This small, slender species is easily recognized by the combination of small size, elongate head, long basal face of propodeum, and low petiole (see worker key and description above). The short scapes (relative to head length), sublucid appearance, and light orange-brown color are also distinctive.

Biology.— The type series was collected in a dry stem of *Eupatorium* sp. The Peruvian specimens are from primary rain forest.

Material examined.— Type material listed above plus the following (USNM, PSWC):

PERU Huánuco: Panguana, 220 m, 9°37'S, 74°56'W (M. Verhaagh); Madre de Dios: Rio Tambopata Res., 30 km SW Pto. Maldonado, 290 m, 12°50'S, 69°20'W (T. L. Erwin *et al.*).

Pseudomyrmex schuppi (Forel)

(Figure 8)

Pseudomyrma schuppi Forel, 1901a:298. Syntype workers, São Leopoldo, Rio Grande do Sul, Brazil (Schupp) (MCSN, MZSP, NHMV) [Examined].

Pseudomyrma schuppi var. *confusior* Forel, 1901a:299. Syntype workers, Rio Grande do Sul, Brazil (Schupp) (MHNG) [Examined] [Synonymy by Kempf, 1961:380; here confirmed].

Pseudomyrma schuppi var. *geraensis* Forel, 1912:23. Syntype workers, Juiz de Fora, Minas Gerais, Brazil (Sampaio) (MHNG) [Examined] [Synonymy by Kempf, 1961:380; here confirmed].

Pseudomyrmex schuppi (Forel); Kempf, 1961:380 [Differentiating characters of worker and queen.]

Worker measurements ($n = 14$).— HL 0.96–1.18, HW 0.82–0.93, MFC 0.023–0.038, CI 0.79–0.88, OI 0.55–0.64, REL 0.52–0.56, REL2 0.62–0.67, OOI 0.23–0.60, VI 0.75–0.84, FCI 0.026–0.042, SI 0.45–0.48, SI2 0.68–0.76, FI 0.39–0.45, PDI 1.16–1.34, MPI 0.037–0.053, NI 0.53–0.62, PLI 0.94–1.07, PWI 0.85–0.99, PPWI 1.32–1.60.

Worker diagnosis.— Relatively large species (HW 0.82–0.93), with broad head (CI 0.79–0.89), and eyes of moderate size; sides of head broadly convex, rounding into the occipital margin which varies from flat to slightly concave; funicular segments II and III about as long as broad (FLI 1.71–2.12, $n=9$). Fore femur, metanotal groove, propodeum, and postpetiole similar to those of *P. oculatus* (*q.v.*), except basal and declivitous faces of propodeum tend to be more clearly differentiated. Petiolar node (Fig. 8) high and broadly rounded in lateral view (PLI 0.94–1.07), very broad in dorsal view (PWI 0.85–0.99), with relatively strong dorsolateral margination; anteroventral process of petiole conspicuous, tooth-like, often bluntly recurved.

Head densely punctate, opaque; mesosoma obscurely punctate to coriarius-imbricate, opaque to subopaque; petiole, postpetiole, and gaster subopaque, covered with numerous fine piligerous punctures. Erect pilosity and appressed pubescence common and conspicuous on most parts of the body including the mesosoma dorsum. Body medium to dark brown, the antennae and tarsi (and sometimes mandibles and promesonotum) lighter in color.

Comments.— *P. schuppi* is diagnosed minimally by its relatively large size (HW > 0.81) and high, broad petiole (PLI > 0.93, PWI > 0.84) whose dorsum is smoothly rounded in lateral profile. Also characteristic of *P. schuppi* are the conspicuous elevation of the basal face of the propodeum above the level of the mesonotum and the posterior displacement of the postpetiolar node as seen in lateral view. These last two features are shared with *P. oculatus*, from which *P. schuppi* is distinguished by petiole shape (see above and compare Figs. 7 and 8) and differences in relative eye length (compare REL2).

Biology.— I have no field experience with this species and the museum material which I have examined contains no biological information. Luederwaldt (1926)

recorded *P. schuppi* nesting under epiphytes.

Material examined (BMNH, ICCM, LACM, MCSN, MCZC, MHNG, MZSP, NHMB, NHMV, PSWC, UCDC, USNM, WWBC).—

ARGENTINA *Misiones*: Iguazú (N. Kusnezov).

BRAZIL AC: Urundiúque, Rio Branco (Machado & Pereira); BA: "Bahia" (c.u.); Encruzilhada, 960 m (Seabra & Alvarenga); Encruzilhada, 980 m (Seabra & Alvarenga); DF: Parque Nac. da Brasília (W. L. & D. E. Brown); ES: Vila Velha (O. Seifert); MG: B. Horizonte (O. Monte); Juiz de Fora (Sampaio); Monsenhor Paulo (V. dos Santos); Passo Quarto (Sampaio); Pedra Azul, 800 m (Seabra & Alvarenga); S. Caraça (Engenho), 800 m (Martins & Silva); Tiradentes (R. L. Araújo); Três Corações (E. Azcanjo); MG?: Tejuca (c.u.); PR: Col. Esperança, Arapongas (W. W. Kempf); Rolândia (W. W. Kempf); RJ: "Prov. Rio" (Göldi); "Rio Janeiro" (c.u.); Corcovado (Alvarenga & Seabra; c.u.); Fonseca, Niterói (C. R. Gonçalves); Ilha Jaguanum (D. Hunt); Ilha da Gipoia, Angra dos Reis (T. Borgmeier); Monumento Rodoviário (C. R. Gonçalves); Monumento Rodoviário, Via Dutra (C. R. Gonçalves); Petrópolis (c.u.); Tôco Sêco (R. L. Araújo); RS: "Rio Gr. do Sul" (Schupp); Laurentino (R. Müller); Pareci Novo (Hansen); São Leopoldo (Schupp); SC: Blumenau (R. L. Araújo; R. Müller; Reichensperger); Florianópolis (R. Müller); Gaspar (S. Fontes; R. Müller); Hamônia (Leuderwaldt); Itajaí (S. Fontes); Nova Teutônia (F. Plaumann); Poco Grande, Gaspar (R. Müller); Quecaba (T. Zimmermann); Rodeio (R. Müller); SP: "Mogy" (c.u.); Agudos (W. W. Kempf; R. Müller); Anhembí, Faz. Barr. Rico (W. W. Kempf *et al.*; L. Travassos F.); Atibaia (W. W. Benson); Barueri (K. Lenko); Botucatu (Göldi); Campo Limpo (W. W. Kempf); Caraguatatuba (Res. Flor.), 40 m (Exp. Depto. Zool.); Caraguatatuba (Res. Flor.), 680 m (K. Lenko); Embu (F. Lane); Est. Biol. Boraceia, Salesópolis (K. Lenko); Faz. Itaquê, Bda Esperança do Sul (K. Lenko); Faz. Itaquê, Nova Europa (K. Lenko); Faz. Itaquê, Tabatinga (K. Lenko); Guaratinguetá (W. W. Kempf); H. Florestal, S. Paulo (F. C. Val); Ilha do Cardoso (L. Foneris); Lençóis Pta. (R. Müller); Rio Claro, Horto Florestal (V. Gama); Rio Manso (c.u.); Rodov. Ciba, km. 40 (W. W. Kempf); S. Roque (F. Lane); S. Sebastião (W. W. Kempf); S. Sebastião, Bairro S. Francisco (W. W. Kempf); São Paulo (Parker); Ubatuba (P. C. Montouchet). PARAGUAY Asunción (P. Duelli); Pastoreo (P. Duelli); San Bernardino (Fiebrig).

Pseudomyrmex urbanus (F. Smith)

(Figures 12a, 12b, 28, 29, 30)

Pseudomyrma urbana F. Smith 1877:65. Syntype workers, Ega, Amazonas, Brazil (BMNH) [Examined]; one worker here designated as LECTOTYPE.

Pseudomyrma chodati Forel 1920:201. Syntype workers, Paraguay (Chodat) (MHNG) [Examined]. One worker here designated LECTOTYPE. *Syn. nov.*

Pseudomyrma ogloblini Santschi, 1936:402. Syntype workers, Loreto, Misiones, Argentina (A. Ogloblin) (MCZC, MZSP, NHMB) [Examined]. *Syn. nov.*

Worker measurements ($n=21$).— HL 0.76–0.95, HW 0.58–0.66, MFC 0.014–0.026, CI 0.69–0.76, OI 0.52–0.58, REL 0.51–0.56, REL2 0.69–0.78, OOI 0.29–1.12, VI 0.76–0.85, FCI 0.022–0.041, SI 0.44–0.48, SI2 0.58–0.67, FI 0.44–0.53, PDI 1.08–1.53, MP1 0.028–0.063, NI 0.51–0.65, PLI 0.76–0.88, PW1 0.55–0.71, PPW1 1.06–1.48.

Worker diagnosis.— A relatively small species (HW 0.58–0.66), with moderately elongate eyes (REL2 0.69–0.78); sides of head (Fig. 12a) subparallel to broadly convex, rounding somewhat gradually into the flat to weakly concave occipital margin; second and third funicular segments broader than long (FLI 1.15–1.58, $n=7$). Fore femur relatively broad; metanotal groove well marked; basal face of propodeum subequal to, or longer than, the declivitous face and usually rounding gently into the latter. Petiole (Fig. 12b) longer than high, with soft dorsolateral margination, and a conspicuous anteroventral process; postpetiole broader than long. Mandibles striato-punctate; head densely punctate, subulid, the punctures often separated by shiny interspaces, especially between the ocelli and compound eye, and immediately posterior to the compound eye, where some punctures are separated by half their diameters or more. Mesosoma punctate to coriarius-imbriate, tending to be subulid dorsally and on the side of the pronotum, more opaque elsewhere. Petiole, postpetiole, and gaster subulid, the lustre dulled by numerous fine piligerous punctures. Fine erect pilosity and appressed pubescence present on most of body, including mesosoma dorsum. Body usually light to medium orange-brown, with varying degrees of infuscation of the gaster,

hindfemur, and (sometimes) head; mandibles and tarsi paler. In a few individuals (Dpto. Beni, Bolivia; Isla Fernando Noronha, Brazil) entire body darker brown.

Comments.— *P. urbanus* belongs to a difficult species complex that also includes *P. caeciliae* and *P. cubaensis* (s.l.). *P. urbanus* workers are characterized by a combination of intermediate size (HW 0.58–0.66), relatively long eyes and broad fore femur (see Figs. 28, 29), and (typically) orange-brown body. These differences are detailed in the keys and in the discussions under *P. caeciliae* and *P. cubaensis*. *P. urbanus* differs from *P. elongatus* (cf. Figs. 6 and 12a) by its shinier appearance, particularly the presence of conspicuous subclinal areas on the head and pronotum, and by its lighter color. The eyes of *P. urbanus* workers tend to be shorter than those of *P. elongatus*, and the petiole is relatively lower.

Some problematic series are in the material listed below. These include unusually dark brown workers from Dpto. Beni, Bolivia and large *cubaensis*-like workers from Ecuador (Piedrero) and Venezuela (Edo. Zulia). The type specimens of *P. chodati* (Forel) and *P. ogloblini* (Santschi) from Paraguay and Argentina, respectively, appear to be rather typical *P. urbanus* insofar as they are in the appropriate size range (HW 0.58–0.61) and have a light orange-brown, subclinal integument; the eyes, however, are rather short (REL2 0.69–0.72). Future studies may reveal more than one species here.

Biology.— Little biological information is available about *P. urbanus*. Collections come from rain forest localities as well as areas typified by drier forest. The type series of *P. chodati* was collected in cauline swellings of *Cordia longituba*, that of *P. ogloblini* in the branches of "*Thecoma ipé*" [= *Tecoma obtusata*] accompanied by coccids; both records suggest a propensity for this species to nest in live plant cavities.

Material examined (BMNH, CKIC, CUIC, GHPC, JTL, KWJC, LACM, MCZC, MHNG, MZSP, NHMB, PSWC, UCDC, USNM).—

ARGENTINA *Misiones*: Loreto (A. A. Ogloblin); Salta: Urundel (c.u.); Tucumán: Tucumán (W. Weyrauch).

BOLIVIA *Beni*: 46 km SSW San Borja, 300 m (P. S. Ward); *La Paz*: Espia Rio Bopi (W. M. Mann).

BRAZIL *AM*: Ega (Bates?); *FN*: Ilha Fernando Noronha (O. Roppa); *GO*: Anápolis (W. W. Kempf); *Jatá* (F. M. Oliveira); *MA*: Ilha de Balsas reg. (Westminster School Exp.); *MG*: Pedra Azul (Seabra & Alvarenga); *Pirapora* (E. Garbe); *Varginha* (Macais); *MS*: Corumbá (D. Hunt); *Faz. Canãa*, Três Lagoas (F. Lane); *MT*: Sinop (M. Alvarenga); *Utiariti*, Rio Papagaio, 325 m (K. Lenko); *Vila Vera* (M. Alvarenga); *PA*: C. Araguaia (J. A. Rafael); *Rio Trepecurú* (Sampaio); *RD*: Vilhena (M. Alvarenga); *SP*: Agudos (C. Gilbert; W. W. Kempf); *Faz. Itaquaré*, Boa Esperança do Sul (K. Lenko); *Piracicaba* (C. A. Triplehorn).

COLOMBIA *Guajira*: Serr. de Macuira, 6–8 km S Nazareth, 70–200 m (W. L. Brown & C. Kugler); *Meta*: R. Guayabero, Angostara 1, 270 m (C. Kugler); *Vichada*: Rio Tomo (W. W. Lamar).

ECUADOR *Pichincha*: Sto. Domingo (S. & J. Peck); *prov. unknown*: Piedrero (M. Deyrup).

FRENCH GUIANA 50 km S Cayenne (G. H. Perrault).

GUYANA *Rupununi*: Karanambo, 100 m (J. T. Longino).

PANAMA *Canal Zone*: Summit (N. H. L. Krauss); *Chiriquí*: "Prov. Chiriquí" (F. M. Gaige).

PARAGUAY: "Paraguay" (Chodat); Pastoreo (P. Duelli).

PERU *Loreto*: 15 km WSW Yurimaguas, 200 m (P. S. Ward); *Madre de Dios*: 30 km SW Pto. Maldonado, 290 m (T. L. Erwin et al.).

SURINAM Moengo, Cottica R. (c.u.); Paramaribo (c.u.).

TRINIDAD Curepe (F. D. Bennett); Maracas Valley (N. A. Weber).

VENEZUELA *Aragua*: 2 km N Ocumare de la Costa (A. S. Menke & L. Hollenberg); *Bolívar*: Campamento Rio Grande, 250 m (P. S. Ward); *T. F. Amazonas*: P. N. Duida–Marahuaka, Culebra, 250 m (K. Jaffé); *T. F. Delta Amacuro*?; “Orinoco Delta” (N. A. Weber); *Zulia*: El Tucuco, Perija (R. W. Brooks *et al.*).

PSEUDOMYRMEX SUBTILISSIMUS GROUP

Introduction

Diagnosis (worker).— Small species (HW 0.48–0.73), with subopaque, densely punctulate, and elongate head (CI 0.56–0.73); mandibles as in the *P. oculatus* group; frontal carinae distinctive: subcontiguous (FCI 0.023–0.066), raised anterodorsally, and merging insensibly into the clypeus (rather than fusing with the antennal sclerite) (Fig. 18), so that in lateral view they form a continuous curve with the median clypeal lobe (Fig. 19); the latter tectiform and protruding, with the anterior margin weakly flared and sharp-edged laterally, but not medially; in dorsal view, median clypeal lobe broadly rounded anteriorly; scapes very short (SI2 0.44–0.59); funicular segments II and III much broader than long (FLI 0.96–1.30); fore femur notably broadened (FI 0.44–0.60); petiole relatively low, long, and slender (PLI 0.54–0.75, PWI 0.48–0.68), without a differentiated peduncle and node, appearing dorsally flattened in lateral profile. Erect pilosity very sparse, lacking on the antennae, legs, and most of head and mesosoma; a characteristic pair of rather long setae present on the pronotal humeri, on the propodeum at the juncture of the basal and declivitous faces, and on the petiolar dorsum. Pubescence covering most of the body, exceptionally fine and inconspicuous in three of the four species. Palp formula: 6,3.

Comments.— This is a small, discrete group of species, uniquely characterized by the configuration of the frontal carinae and the clypeus. The elongate head, short scapes, flattened apedunculate petiole, and patterns of pilosity are also distinctive.

Features shared with the *P. oculatus* group include the protruding, tectiform, median clypeal lobe; palp formula of 6, 3; and elongate head and eyes. In addition preliminary observations suggest similarities in the male genitalia which, together with the shared worker characters, support the notion of a close relationship between these two groups.

Synonymic List of Species

P. spiculus, *sp. nov.* Mexico to Peru, Bolivia

P. subtilissimus (Emery, 1890). Nicaragua, Costa Rica

P. tenuissimus (Emery, 1906), *stat. nov.* Mexico to Peru, Brazil

= *P. culmicola* (Forel, 1912), *syn. nov.*

P. villosus, *sp. nov.* Brazil

Key to Species (workers and queens)

Note.— Only a few queens have been examined (unknown in *P. villosus*) and the ranges of measurements and indices for queens may be somewhat broader than the known limits given here.

- 1 Small species (HW < 0.67) with elongate head and eyes (worker CI 0.56–0.71, queen CI 0.43–0.61; worker REL2 0.76–0.92, queen REL2 0.84–1.15) (Figs. 32, 34, 36); pubescence very short and inconspicuous, tightly appressed to body 2
- 1' Larger species (HW 0.73, in unique worker type), with relatively broad head and short eyes (CI 0.73, REL2 0.72) (Fig. 38); body pubescence conspicuous, decumbent to suberect (Brazil)..... *P. villosus*, *sp. nov.*, p. 434
- 2 (1) Very small species (worker HW 0.48–0.53; queen HW 0.42–0.51, n=5), with elongate head (worker CI 0.56–0.62; queen CI 0.43–0.53) and slender petiole (worker PLI 0.54–0.66; queen PLI 0.55–0.62) (Figs. 36, 37) (Mexico to Peru, Brazil).....*P. tenuissimus* (Emery), p. 432
- 2' Larger species (worker HW 0.55–0.66; queen HW 0.56–0.63, n=6), with broader head (worker CI 0.60–0.71; queen CI 0.55–0.61); if worker HW < 0.60, then petiole generally rather short (worker PLI 0.65–0.75) 3
- 3 (2') Smaller species (worker HW 0.55–0.59; queen HW 0.56, 0.57, n=2) with more elongate head (worker CI 0.60–0.65, queen CI 0.55, 0.57) and with relatively short petiole (worker PLI 0.65–0.75, queen PLI 0.63, 0.68) (Figs. 34, 35) (Nicaragua, Costa Rica).....*P. subtilissimus* (Emery), p. 432
- 3' Larger species (worker HW 0.61–0.66; queen HW 0.61–0.63, n=4), with broader head (worker CI 0.66–0.71; queen CI 0.60–0.61) and slender petiole (worker PLI 0.56–0.67; queen PLI 0.56–0.61) (Figs. 32, 33) (Mexico to Peru, Brazil)
..... *P. spiculus*, *sp. nov.*, p. 431

Species Accounts

Pseudomyrmex spiculus sp. nov.

(Figures 31, 32, 33)

Pseudomyrmex subtilissimus tenuissimus; Kempf (nec Emery) 1972:224 (partim).

Holotype Worker.— COSTA RICA, Prov. Puntarenas: Reserva Biológica Carara, 500m, 9°47'N, 84°36'W, 26.viii.1985, on low vegetation, old field/pasture,

P. S. Ward acc. no. 7668-9 (MCZC). HW 0.63, HL 0.89, EL 0.50, PL 0.37, PH 0.22.

Paratype Workers, Queens.— Same data as holotype, two workers; COSTA RICA, *Prov. Puntarenas*: Manuel Antonio Natl. Park, 10m, 9°23'N, 84°09'W, 28.vii.1985, P. S. Ward acc. no. 7715-6, 1 worker; same locality, 40m, 27.vii.1985, P. S. Ward acc. no. 7679, 1 dealate queen; Llorona, Corcovado Natl. Park, 10m, 10-14.v.1979, P. S. Ward acc. no. 3389-6, 1 worker; Sirena, Corcovado Natl. Park, 50m, 8°28'N, 83°35'W, 22.iv.1981, J. T. Longino, 1 worker; same locality, 20.xii.1981, J. T. Longino, 1 worker; COSTA RICA, *Prov. Limón*: Portete, 13.ii.1965, D. H. Janzen, 1 worker. (JTLC, LACM, MNCR, MZSP, PSWC, USNM).

Type series is restricted to the above material from Costa Rica. Additional, apparently conspecific material comes from Mexico, Panama, Colombia, Guyana, Brazil, and Peru (see "Material examined" below).

Worker measurements (n=14).— HL 0.88-0.98, HW 0.61-0.66, MFC 0.022-0.042, CI 0.66-0.71, OI 0.55-0.61, REL 0.53-0.57, REL2 0.76-0.83, OOI 0.04-0.67, VI 0.79-0.87, FCI 0.034-0.064, SI 0.38-0.43, SI2 0.46-0.54, FI 0.48-0.55, PDI 1.20-1.61, MPI 0.029-0.059, NI 0.60-0.71, PLI 0.56-0.67, PWI 0.48-0.59, PPWI 1.14-1.37.

Worker diagnosis.— Small, slender species (HW 0.61 - 0.66); head (Fig. 32) elongate, although broader than that of *P. tenuissimus* (CI 0.66-0.71); eyes elongate, almost reaching the level of the median ocellus; occipital margin concave in full face, dorsal view; lateral margins of pronotum rounded; fore femur short and broad (FI 0.48-0.55); metanotal groove narrow, shallow; basal face of propodeum convex, declivitous face flat to weakly concave, the former about 1.5 times the length of the latter; basal face of propodeum rounding into the declivitous face at a slight (obtuse) angle, marked by a pair of erect setae; petiole (Fig. 33) slender, low, notably longer than wide (Fig. 31; PLI 0.56-0.67); postpetiole short, globose in lateral view, subtriangular in dorsal view, about as wide as long, and twice as wide as the petiole (PWI 0.51-0.57). Mandibles finely striate with scattered punctures, sublucid; head, mesosoma, and petiole densely punctulate to coriarius-imbriate, opaque; postpetiole and gaster opaque, with numerous fine piligerous punctures. Erect pilosity very sparse (except on apex of gaster), lacking on the antennae, sides of head, upper half of gula, femora (except for one to several setae on the ventral surface of the fore femur), tibiae, tarsi, and most of mesosoma. Two or three pairs of short erect setae on dorsum of head; a conspicuous pair of long (ca. 0.15 mm) erect setae on the anterolateral corners of pronotum, at the juncture of the basal and declivitous faces of the propodeum, and on the posterior dorsum of both the petiole and postpetiole; the last two pairs often accompanied by a pair of shorter, posterolateral setae. Appressed pubescence common on most of body, but rather fine and inconspicuous. Grey-brown; mandibles, fronto-clypeal complex, antennae, tarsi, pronotum, petiole, and postpetiole paler luteous-brown.

Comments.— The combination of relatively large size, broad head, and slender petiole serves to distinguish *P. spiculus* from the other species in the *P. subtilissimus* group (see Figs. 31-39).

Biology.— The species is widespread but infrequently collected, and little is known about its biology. Most collections are based on single individuals foraging on low vegetation or tree-falls, in rain forest, rain forest edge, littoral forest, and mangrove. In Costa Rica I collected a single dealate (colony-founding?) female in a loose dead twig, hanging in low vegetation, in coastal rain forest. Type workers from Reserva Biológica Carara were foraging on the trunk and associated vegetation of a strangler fig tree (*Ficus oerstediana*) and its unidentified host tree, in an old pasture. At this location, workers of *P. tenuissimus* were present on the same

vegetation, foraging in close proximity to those of *P. spiculus*. These two species have been collected sympatrically elsewhere, and their ranges are broadly coextensive.

Material examined.— Type material listed above, plus the following (INPA, LACM, MCZC, MZSP, PSWC, UCDC):

BRAZIL *AM*: Manaus to Itacoatiara Hwy., km 34 (W. L. & D. E. Brown), *MT*: Sinop 55°37'W, 12°31'S (M. Alvarenga); *RD*: Vilhena (A. Y. Harada).

COLOMBIA *Magdalena*: 4 km N San Pedro, 550 m (P. S. Ward); Cañaveral, < 5 m (P. S. Ward).

GUYANA *Mazaruni-Potaro*: Kartabo (W. M. Wheeler); *Rupununi*: Upper Essequibo (J. G. Myers).

MEXICO *Jal.*: 14 km SSE Chamela, 20 m (P. S. Ward).

PANAMA *Canal Zone*: 5 km WNW Gatun Dam, 160 m (P. S. Ward); Barro Colorado I. (N. Banks; R. B. & L. S. Kimsey); *Colón*: Colón (E. Adams).

PERU *Madre de Dios*: Rio Tambopata Reserve, 30 km SW Pto. Maldonado, 290 m (T. L. Erwin *et al.*).

Pseudomyrmex subtilissimus (Emery)

(Figures 31, 34, 35)

Pseudomyrma subtilissima Emery 1890:65. Syntype workers, one dealate queen, Alajuela, Costa Rica (Alfaro) (MCSN) [Examined]. One syntype worker here designated as LECTOTYPE.

Worker measurements ($n=17$, except for *FI* where $n=16$).— HL 0.86–0.95, HW 0.55–0.59, MFC 0.020–0.032, CI 0.60–0.65, OI 0.52–0.59, REL 0.49–0.54, REL2 0.80–0.87, OOI 0.38–0.89, VI 0.79–0.88, FCI 0.035–0.055, SI 0.41–0.47, SI2 0.50–0.57, FI 0.44–0.53, PDI 1.60–1.88, MPI 0.015–0.039, NI 0.52–0.66, PLI 0.65–0.75, PWI 0.56–0.68, PPWI 1.18–1.35.

Worker diagnosis.— Similar to *P. spiculus* (*q.v.*) except as follows: smaller, head (Fig. 34) more elongate (HW 0.55–0.59, CI 0.60–0.65), eyes shorter, not reaching the level of the median ocellus (REL 0.49–0.54); basal face of propodeum flatter, meeting the declivitous face at a more distinct angle; petiole (Fig. 35) shorter, higher (PLI 0.65–0.75). Most of body uniformly light brown; gaster dark brown, with contrasting light brown band on anterior half of abdominal tergite IV.

Comments.— A moderately elongate head (broader than *P. tenuissimus*, more elongate than *P. spiculus* and *P. villosus*; see Fig. 31), short petiole, and light brown color (with banded gaster) characterize *P. subtilissimus*.

Biology.— This species has been collected only in, or on, swollen-thorn acacias, in association with *Pseudomyrmex flavicornis* (F. Smith). The collection records suggest that it is an obligate, non-aggressive acacia ant which somehow manages to coexist with *P. flavicornis*.

Material examined (BMNH, LACM, MCSN, MHNG, MZSP, NHMV, PSWC, USNM).—

COSTA RICA *Alajuela*: Alajuela (Alfaro); *Puntarenas*: 1 km NE Tárcoles, 20 m (P. S. Ward); Est. Biol. Palo Verde, 10 m (J. T. Longino); *San José*: 3.5 km NE Santiago de Pur (D. H. Janzen); Rio Oro (D. H. Janzen); *prov. unknown*: "Costa Rica" (Alfaro; Cameron; *c.u.*).

NICARAGUA *Matagalpa*: 15.8 mi. W Jebaca [= Sebaco] (D. H. Janzen).

Pseudomyrmex tenuissimus (Emery) *stat. nov.*

(Figures 18, 19, 31, 36, 37)

Pseudomyrma subtilissima subsp. *tenuissima* Emery, 1906:119. Holotype (unique syntype) worker, Corumba, Matto Grosso [do Sul], Brazil, 15.viii.1900, (MCSN) [Examined].

Pseudomyrma culmicola Forel, 1912:217. Holotype (unique syntype) worker, Trinidad (Forel) (MHNG)

[Examined]. Syn. nov.

Pseudomyrmex subtilissimus; Wheeler & Wheeler (nec Emery), 1973:207 [description of larva].

Worker measurements ($n=30$, except for *FI* where $n=29$).— HL 0.82–0.93, HW 0.48–0.53, MFC 0.011–0.033, CI 0.56–0.62, OI 0.50–0.58, REL 0.48–0.53, REL2 0.84–0.92, OOI 0.22–0.89, VI 0.85–0.90, FCI 0.023–0.066, SI 0.39–0.46, SI2 0.44–0.54, FI 0.52–0.60, PDI 1.58–2.14, MPI 0.022–0.055, NI 0.55–0.64, PLI 0.54–0.66, PWI 0.49–0.60, PPWI 1.05–1.34.

Worker diagnosis.— Similar to *P. spiculus* (q.v.) except as follows: distinctly smaller, head (Fig. 36) more elongate (HW 0.48–0.53, CI 0.56–0.62). Basal face of propodeum flatter, forming a more distinct angle with the declivitous face. Body color more uniformly brown to grey–brown, the pronotum, petiole, and postpetiole only slightly, or not at all, contrastingly lighter.

Comments.— *P. tenuissimus* can be distinguished from *P. subtilissimus* by its darker color, smaller size, and longer petiole (compare Figs. 35 and 37). It differs from *P. spiculus* by its smaller size and more elongate head (compare HW and CI; see Fig. 31). The unique syntype (holotype) of *P. culmicola* fits easily within this concept of *P. tenuissimus*.

Biology.— Although *P. tenuissimus* is the most common member of the *P. subtilissimus* group, most collections appear to be based on scattered foragers. In Costa Rica, Panama, and Colombia, I have encountered workers foraging on vegetation in a variety of habitats including rain forest, rain forest edge, old field/pasture, and tropical dry forest. I have seen nests only twice: one was a small colony containing a single dealate queen, seven workers, and brood, in the dead, fibrous twig of a woody liana, in tropical dry forest (northern Colombia); the other was a nest of 13 workers, 16 alate queens, and brood in the dead twig of a thorny vine at the edge of disturbed second-growth rain forest (Edo. Barinas, Venezuela). Mann (1916:426) recorded a colony from Maranhão, Brazil "taken from beneath a loose piece of bark", an unusual nest-site for *Pseudomyrmex* as Mann himself remarks.

Material examined (INPA, IZAV, JTLC, KWJC, LACM, MCSN, MCZC, MHNG, MZSP, PSWC, UCDC, USNM, WPMC, WWBC).—

BELIZE Belize (N. L. H. Krauss).

BOLIVIA Beni: Cavinás (W. L. Mann).

BRAZIL AM: Faz. Esteio, 80 km NNE Manaus, 80 m (P. S. Ward); Manaus, 60 m (P. S. Ward); Rio Tarumá Mirim-Igapó (J. Adis); Tarumá-Mirim (J. Adis); km. 27, ZF-3, near Manaus (W. W. Benson); CE: Itapipoca (C. R. Gonçalves); ES: Vitória, Penha (R. Müller); GO: Jataí (F. M. Oliveira); MA: "Maranhão" (W. M. Mann; c.u.); Bacabal (W. W. Kempf); MG: Pedra Azul (F. M. Oliveira); Arassuaçu (Thieman); MS: Corumbá (c.u.); Imbirussú-Corumbá (K. Lenko); MT: Sinop (M. Alvarenga); Utiariti, Rio Papagaio, 325m (K. Lenko); Vila Vera (M. Alvarenga); PA: Belém (C. R. Gonçalves); C. Araguaia (J. A. Rafael; A. Y. Harada); Igarapé-Açu (C. R. Gonçalves); S. Norte, Carajás (W. W. Benson); RJ: Fonseca, Niterói (C. R. Gonçalves); RN: Natal (W. M. Mann); SP: Faz. Campininha, Mogi Guaçu (H.C.M.).

COLOMBIA Caquetá: Florencia (W. P. MacKay); Cundinamarca: El Colegio & Anapoima (I. Zenner); Huila: 15 mi. S Neiva (W. & E. MacKay); 15 mi. W Campoalegre (W. & E. MacKay); Colombia (W. & E. MacKay). Magdalena: 8km NE Cienaga, 40m (P. S. Ward); Cañaveral, 50m (P. S. Ward); Magdalena?: locality illegible (A. Forel); Meta: Carimagua (M. Corn); Valle: Dagua (W. & E. MacKay).

COSTA RICA Atajuela: 11 mi. N. Florencia (D. H. Janzen); Heredia: F. LaSelva, 3km S Pto. Viejo (H. A. Hespenheide); 3 km S Pto. Viejo (J. T. Longino); Limón: Portete (D. H. Janzen); Puntarenas: Boca Barranca (D. H. Janzen); Llorona, Corcovado Natl. Park, 0–100m (J. T. Longino); Llorona, Corcovado Natl. Park, 10m (P. S. Ward); Reserva Biol. Carara, 500m (P. S. Ward); Sirena, Corcovado Natl. Park, 0–100m, 50m (J. T. Longino).

ECUADOR prov. unknown: Piedrero (M. Deyrup).

- EL SALVADOR San Salvador: Lago de Ilopango, N. side (R. Silberglied).
- FRENCH GUIANA Cayenne (Pillault).
- GUYANA *East Demerara-West Coast Berbice*: Botanic Gardens, Georgetown (H. Morrison); *Mazaruni-Potaro*: Kartabo (W. M. Wheeler).
- HONDURAS *Cortes*: Lago Yojoa, 680m (W. L. Brown).
- JAMAICA Kingston (N. L. H. Krauss); St. James: Great R., 0–80m (J. T. Longino); Trelawny: Green Park, 0–150m (J. T. Longino).
- MEXICO *Oax.*: 5 mi. E Temascal (D. H. Janzen); *S.L.P.*: Tamazunchale (W. S. Ross); *Ver.*: Pueblo Nuevo, nr. Tetzoapala (E. O. Wilson); Rio Tonto (D. H. Janzen); 29.5 mi. NW Tuxpam on Hwy. 122 (D. H. Janzen).
- NICARAGUA *Matagalpa*: El Tuma, 30km E Matagalpa, Hwy. 5, 330m (C. Kugler & J. Hahn).
- PANAMA *Canal Zone*: 3km SW Gatun, 100m (W. L. Brown *et al.*); 5km WNW Gatun Dam, 160m (P. S. Ward); Barro Colorado I. (W. M. Wheeler; H. Wolda); Cerro Galera, 9km W Panama City (W. L. Brown *et al.*); Mt. Hope, nr. Colon (W. M. Wheeler); Ruta 1, 14km W Panama City, 100m (Brown, W. L. *et al.*); *Panamá*: Chilibra R. (W. M. Wheeler); Rio Piedras (D. H. Janzen); Taboga Island (A. Busck); *prov. unknown*: Lilina R. (W. M. Wheeler).
- PERU *Huánuco*: Panguana, 200 m (M. Verhaagh); *Junín*: Valle Chanchamayo, 800 m (Weyrauch); *dpto. unknown*: Queb. Penaga, Anotape Mts. (Frizzell)
- TRINIDAD *Curepe* (F. D. Bennett): Mayaro Bay (N. Weber); St. Augustine (N. Weber; Darlington); "Trinidad" (Forel).
- VENEZUELA *Apure*: Mantecal (H. Romero); *Barinas*: 10km WNW Santa Barbara, 280 m (P. S. Ward); 17 km SSW Ciudad Bolívar, 240 m (P. S. Ward); Rio Capara Res. Stn., 32 km E El Canton (J. B. Heppner); *Carabobo*: Hda. El Palmar, Las Trincheras, 850m (J. & B. Bechyne); *T. F. Delta Amacuro*?: "Orinoco Delta" (N. A. Weber); *Zulia*: El Tucuco, Perija (R. W. Brooks *et al.*).

Pseudomyrmex villosus sp. nov.

(Figures 38, 39)

Holotype Worker.— BRAZIL, MT: Utariti, Rio Papagaio [= Rio Sauêruinã] [13°02'S, 58°17'W], 325m, viii.1961, K. Lenko (MZSP).

Holotype measurements.— HL 1.00, HW 0.73, MFC 0.038, EL 0.53, PL 0.38, PH 0.27, CI 0.73, OI 0.60, REL 0.53, REL2 0.72, OOI 0.51, VI 0.81, FCI 0.052, SI 0.43, SI2 0.59, FI 0.50, PDI 1.50, MPI 0.035, NI 0.62, PLI 0.71, PWI 0.64, PPWI 1.39.

Worker diagnosis.— A large species (for the *P. subtilissimus* group) with broad head and relatively short eyes (Fig. 38). Sides of head broadly convex, rounding into the distinctly concave occipital margin. Fore femur broad; metanotal groove rather shallow; basal face of propodeum slightly convex (lateral view), rounding into the much shorter declivitous face. Petiole (Fig. 39) relatively short and high, with a distinct anteroventral tooth; postpetiole broader than long.

Mandibles striato-punctate, subopaque. Head densely punctulate, sublucid, with shiny interspaces between the fine, partially effaced punctulae. Remainder of body punctulate to coriarius-imbriate, largely sublucid. Erect pilosity sparse, distributed as in *P. spiculus* (q.v.). Pubescence common on most of body, many hairs decumbent to suberect, and thus more conspicuous than in other members of the *P. subtilissimus* group. Body brown, mandibles, tarsi, petiole, postpetiole, and (to a lesser extent) pronotum and antennae lighter (luteous-brown) in color.

Comments.— Known only from the holotype worker, this species can be recognized by its large size, broad head, short eyes, and rather conspicuous (subdecumbent) pubescence. The short petiole and sublucid integument are also distinctive.

TAXONOMIC COMMENTS ON OTHER *PSEUDOMYRMEX* SPECIES**Introduction**

The following notes are based on critical examination of type material in various (mostly European) collections, supplemented by infusions of fresh material from recent field work in Central and South America. Most of the new synonymies given here are those that I consider relatively clear and straightforward. Much additional synonymy is certain, but this cannot be documented reliably without detailed species-level revisions of the groups concerned. Despite such synonymy, it should also be pointed out that there are considerable numbers of undescribed species, especially in the *P. pallidus* group.

Twenty-two species and 64 available names are formally dealt with below. The valid species are listed alphabetically and described briefly, with related taxa discussed or cross-referenced where appropriate. I have given particular attention to species associated with ant-plants (*Acacia*, *Tachigali*, *Triplaris*, etc.) because these have received considerable ecological attention, often accompanied by taxonomic inaccuracies. Grouped according to the plants which they inhabit, the following plant-associated species of ants are discussed and diagnosed:

Acacia *P. ferrugineus*, *P. flavicornis*, *P. nigrocinctus* (under *P. ferrugineus*), *P. nigropilosus* (under *P. ferrugineus*), *P. spinicola*, *P. subtilissimus* (above, p. 432). See also note added in proof on *P. peperii* (p. 452).

Pithecellobium

P. perboscii

Tachigali *P. concolor*, *P. malignus*, *P. tachigaliae*

Triplaris *P. dendroicus*, *P. triplaridis*, *P. triplarinus* (under *P. dendroicus*), *P. viduus*

P. viduus occurs in association with additional ant-plant genera (*Ocotea*, *Cordia*, *Sapium*, etc.), displaying a catholicity not found in the other *Pseudomyrmex*.

Species accounts*Pseudomyrmex concolor* (F. Smith)

(Figure 40)

Pseudomyrma concolor F. Smith, 1860:70. Syntype dealate queen (unique?), "St. Paul" [São Paulo de Olivença], Amazonas, Brazil (BMNH) [Examined].

Pseudomyrma penetrator F. Smith, 1877:66. Syntype alate queen, "St. Paul" [São Paulo de Olivença], Amazonas, Brazil (BMNH) [Examined] [Synonymy by Kempf, 1967:5; here confirmed].

Pseudomyrma latinoda Mayr, 1877:877. Holotype worker, Amazonas [probably Barreiras de Unahan, Rio Purus; see Benson & Setz, 1985], Brazil (Trail) (NHMV) [Examined]. *Syn. nov.*

Pseudomyrma damnosa Wheeler, 1921b:139. Syntype workers, queens, males, Kartabo, Guyana (W. M. Wheeler) and Penal Settlement, Guyana (W. M. Wheeler) (MCZC) [Examined] [Synonymy, under *P. latinodus* (Mayr), by Kempf, 1961:406; here confirmed].

This is a widespread *Tachigali*-inhabiting species, usually going by the name *P. latinodus* (Mayr). Comparison of the type queen of *P. concolor* with worker-associated queens of *P. latinodus* from Brazil, Guyana, and Venezuela, shows that the two are conspecific. Among the several species of *Pseudomyrmex* associated with *Tachigali*, the queens and workers of *P. concolor* are recognized by the following combination of features: upper third of the head predominantly smooth and shining, with scattered punctures of variable density; median clypeal lobe ventrally deflected and without lateral teeth or angles (Fig. 40); erect pilosity conspicuous on most parts of the body, including the sides of the head; light orange-brown in color.

The relationship of *P. concolor* to the four forms described as varieties of *P. latinodus*, namely *P. coronatus* (Wheeler), *P. endophytus* (Forel), *P. nigrescens* (Forel), and *P. opacior* (Forel), is unclear. Closely related but distinct species in this complex include *P. malignus* (Wheeler) (*q.v.*) and *P. tachigaliae* (Forel) (*q.v.*), differing in pilosity and clypeal configuration (compare Figs. 40, 41, 42).

Pseudomyrmex dendroicus (Forel), *stat. reval.*

Pseudomyrma dendroica Forel, 1904a:40. Syntype workers, males, Rio Purus, Amazonas, Brazil (A. Göldi) (MCSN, MHNG, MZSP) [Examined]. One syntype worker in MHNG here designated LECTOTYPE. *Stat. reval.* [Incorrectly synonymized with *P. triplarinus* (Weddell) by Kempf, 1961:408]
Pseudomyrma dendroica var. *emarginata* Forel, 1904b:684. Syntype workers, queen, Mavany Jurua, Amazonas, Brazil (Ulc) (MCSN, MHNG) [Examined] *Syn. nov.* [Incorrectly synonymized with *P. triplarinus* (Weddell) by Kempf, 1961:408]

This ant is one of several *Pseudomyrmex* species which are obligate inhabitants of trees of the genus *Triplaris*. Workers of *P. dendroicus* are distinguished from those of the closely related species, *P. triplarinus* (Weddell) (= *P. arborissanctae* (Emery)), by the following features: (i) more widely separated frontal carinae; (ii) dark brown head, contrasting with a lighter-colored mesosoma (head and mesosoma more or less concolorous in *P. triplarinus*); (iii) subpetiolar process usually subrectangular and recurved backwards to some degree (subtriangular in *P. triplarinus*); (iv) erect pilosity less abundant; fewer than 10 standing hairs in outline on outer surface of hind tibia (erect pilosity more conspicuous and abundant in *P. triplarinus*).

See also descriptions of *P. triplaridis* (Forel) and *P. viduus* (F. Smith).

Pseudomyrmex ejectus (F. Smith)

Pseudomyrma ejecta F. Smith, 1858:157. Lectotype worker, "Brazil?" (BMNH) [Examined] [Lectotype designation and discussion of type locality by Ward, 1985:231].
Ponera (*Ectatoma*) [sic] *lincecumii* Buckley, 1866:172. Syntype worker(s), "On trees in Central Texas" [type(s) lost; not examined]. *Syn. nov.*

In a recent review of the Nearctic species of *Pseudomyrmex* (Ward, 1985) I did not consider this long-standing *nomen dubium*. The original description supports

Smith's (1951,1958) placement of *Ponera lincecumii* in the Pseudomyrmecinae. Among the species of Pseudomyrmecinae occurring in central Texas, only *Pseudomyrmex ejectus* (F. Smith) conforms to Buckley's description with respect to size and color ("length 0.15 inch. Upper surface of head and abdomen sub-piceous, the rest reddish-yellow or pale yellow...") and there is nothing in Buckley's description which precludes *P. ejectus*. As the Nearctic *Pseudomyrmex* species are now relatively well-known (Ward, 1985), the synonymy seems reasonably secure.

Pseudomyrmex euryblemma (Forel)

Pseudomyrma euryblemma Forel, 1899:90. Syntype worker, (unique), Alajuela, Costa Rica (Alfaro) (MCSN) [Examined].

Pseudomyrma kurokii Forel, 1906:226. Syntype worker (unique), Sierra Nevada de Santa Marta, Colombia (Forel) (MHNG) [Examined]. *Syn. nov.*

P. euryblemma is a common and widespread species, whose laterally angulate median clypeal lobe (in workers and queens) and anteroventrally recurved pygidium (in males), clearly place it in the *P. pallidus* group. Workers of this species have a broad head (HW 0.81–0.98, CI 0.86–0.92; n=14) whose punctulate-coriarius sculpture weakens towards the vertex (which is subcladid); wide but shallow metanotal groove; long basal face of the propodeum; and pubescent fourth abdominal tergite. The propodeal spiracles are rather salient in dorsal view, and individuals are typically dark brown in color.

See also *P. holmgreni* (Wheeler) and *P. rufiventris* (Forel).

Pseudomyrmex ferrugineus (F. Smith)

(Figure 45)

Pseudomyrma ferruginea F. Smith, 1877:64. Syntype workers, Mexico (BMNH) [Examined]; one worker here designated LECTOTYPE.

Pseudomyrma belti race *fulvescens* Emery, 1890:64. Syntype workers, Guatemala (Beccari) (MCSN) [Examined] *Syn. nov.* One worker here designated LECTOTYPE.

Pseudomyrma canescens Wasmann, 1915:321. Syntype workers, Tampico, Mexico (Brakhoven) (MCSN, MCZC) [Examined] *Syn. nov.* (Also preoccupied).

Pseudomyrma wasmanni Wheeler, 1921a:22. Replacement name, now unnecessary, for *P. canescens* Wasmann, 1915 (nec F. Smith, 1877).

Pseudomyrma belti subsp. *bequaerti* Wheeler, 1942:164. Syntype workers, Puerto Castillo, Honduras (J. Bequaert) (MCZC) [Examined] *Syn. nov.* One worker here designated LECTOTYPE.

Pseudomyrma belti subsp. *saffordi* Wheeler, 1942:162. Syntype workers, Chicomilco, Chiapas, Mexico (G. N. Collins) (MCZC) [Examined] *Syn. nov.* One worker here designated LECTOTYPE.

Pseudomyrma belti subsp. *vesana* Wheeler, 1942:163. Holotype (unique syntype) worker, Cordoba, Mexico (F. Knab) (MCZC) [Examined] *Syn. nov.*

Pseudomyrma belti subsp. *bequaerti* Enzmann, 1945:80. Syntype workers, Puerto Castillo, Honduras (J. Bequaert) (MCZC) [Examined] [Objective synonym of *P. belti bequaerti* Wheeler; Brown, 1949:42].

Pseudomyrma kuenckeli var. *hondurana* Enzmann, 1945:87. Three syntype workers, Honduras (Bates) (MCZC) [Examined]; one syntype here designated LECTOTYPE. *Syn. nov.* [Incorrectly synonymized under *P. kuenckeli* (Emery) by Kempf, 1961:402].

P. ferrugineus (F. Smith) is an obligate inhabitant of swollen-thorn acacias, distributed from Mexico to Honduras, whose interaction with the acacias was the

subject of a detailed experimental study by Janzen (1967). The worker of *P. ferrugineus* has a densely punctate head which is nevertheless weakly sublucid in the area between the ocelli and upper margin of the compound eye; the median clypeal lobe is anteroventrally subtended and without lateral angles or teeth (Fig. 45); and the body is variable in color, usually brown or dark brown, the mesosoma sometimes lighter in color than the head and gaster.

The Costa Rican acacia-ant reported in the ecological literature as "*Pseudomyrmex ferruginea*" (e.g., Janzen, 1983) is, in fact, *P. spinicola* (Emery) (q.v.). The two other common members of the *P. ferrugineus* group in Costa Rica are *P. flavicornis* (F. Smith) (q.v.) and the small (worker HW < 0.85), orange-brown species, *P. nigrocinctus* (Emery). A fourth species of acacia-ant, *P. nigropilosus* (Emery), is a member of the *P. gracilis* group and is recognizable by its large size (worker HW > 1.16), elongate eyes which almost reach the level of the median ocellus, laterally submarginate pronotum, and conspicuous black pilosity (further description in Kempf, 1958). Like *P. subtilissimus* (see above, p. 432) *P. nigropilosus* is a non-aggressive species, whose workers provide no protection to the acacia that they occupy (Janzen, 1975).

Pseudomyrmex filiformis (Fabricius)

Formica filiformis Fabricius, 1804:405. Syntype dealate queen, Essequibo, Guyana (Smidt) (ZMUC) [Examined]; here designated as LECTOTYPE. A second syntype dealate queen in ZMUC, lacking head, metasoma, and a locality label, has been labelled paralectotype.

Pseudomyrma cephalica F. Smith, 1855:168. Dealate queen, labelled as type, Santarem, Brazil (Bates); two workers, probable syntypes, Villa Nova, Brazil (Bates) (BMNH) [Examined] [Synonymy by Roger, 1862:289].

Pseudomyrma biconvexa Forel, 1899:95. Syntype workers, Pantaleon, Guatemala (Champion) (BMNH, MHNG); Costa Rica (Tonduz) (BMNH) [Examined] [Synonymy by Wheeler, 1919:125].

Pseudomyrma biconvexa var. *longiceps* Forel, 1906:229. Syntype worker, Santa Marta, Colombia (A. Forel) (MHNG) [Examined]. *Syn. nov.*

Pseudomyrma longiceps Stitz, 1933:69. Holotype queen, Macuto, near La Guayra, Venezuela (C. Gazgo) (not in ZMUH, probably destroyed during World War II). *Syn. nov.* (Also preoccupied).

The syntype worker of *P. longiceps* (Forel) is simply a large *P. filiformis* worker, with a rather elongate head and a conspicuous subpetiolar tooth. I have seen such variant workers within nest-series of typical *P. filiformis* from elsewhere in Central and South America. Although the unique type of *P. longiceps* (Stitz) is lost, the original description (particularly as it pertains to head length, position of eyes, and petiole shape) is closer to that of *P. filiformis* than any other species known to me.

Pseudomyrmex flavicornis (F. Smith)

Pseudomyrma flavicornis F. Smith, 1877:67. Three syntype workers, Nicaragua (BMNH) [Examined]. One syntype here designated LECTOTYPE.

Pseudomyrma belti Emery, 1890:63. Syntype workers, queens, Alajuela, Costa Rica (MCSN) [Examined]. *Syn. nov.*

Pseudomyrma belti var. *obnubila* Menozzi, 1927:273. Syntype worker, San José, Costa Rica (H. Schmidt)

(NHMB) [Examined]. *Syn. nov.*

Pseudomyrma belti subsp. *felloso* Wheeler, 1942:160. Syntype workers, Nicaragua (W. Fluck); Granada, Nicaragua (C. F. Baker) (MCZC) [Examined]. *Syn. nov.*

P. flavicornis is a widespread Central American acacia-ant, referred to in most publications as *P. belti*. Because the taxonomic status of *P. belti* and its various "subspecies" or "varieties" has never been fully clarified, I have little hesitation in replacing *P. belti* with the less well-known senior synonym. Of the various infraspecific names associated with *P. belti* (see Kempf, 1972), only two (*P. obnubilus* and *P. felloso*) are here considered synonyms of *P. flavicornis*. One of the remaining names refers to an apparently distinct species (*P. veneficus* Wheeler), while the others are synonyms of *P. ferrugineus* (q.v.). The worker of *P. flavicornis* is distinguished from other obligate acacia-ants (*P. ferrugineus* group) by its dark brown or black color (mesosoma sometimes contrastingly lighter); broad, densely punctate, opaque head which lacks a sublucid area posteromesad of the compound eye (in contrast to *P. ferrugineus*); and narrow, anteroventrally subtended, median clypeal lobe, whose lateral corners are rounded.

Pseudomyrmex gracilis (Fabricius)

Formica gracilis Fabricius, 1804:405. Syntype worker, Essequibo, Guyana (Smidt) (ZMUC) [Examined]; here designated LECTOTYPE.

Pseudomyrma variabilis F. Smith, 1877:62. Syntype worker, "Barbadoes" (BMNH) [Examined]; here designated LECTOTYPE. *Syn. nov.*

The lectotype worker of *P. gracilis*, although lacking a head, seems to correspond rather well to the concept of *P. gracilis* which has become prevalent in publications. The mesosoma, postpetiole, and gaster are dark brown to black, the petiole a contrasting light castaneous brown; fine, silvery (not black) pilosity covers most of the body, and the associated piligerous punctures subdue the lustre of the integument; the petiole is narrow and slender, with a long anterior peduncle; and the pronotum is margined laterally but not sharply so. I do not attach much taxonomic significance to the light-colored petiole. The *P. gracilis* lectotype worker agrees well with material from Kartabo, Guyana (leg. Wheeler) in which there is variable infuscation of the petiole. A second worker in the *P. gracilis* "type series" in ZMUC, with a red "TYPE" label, but no locality or identification label, is in fact not conspecific (it is a worker of *P. maculatus* (F. Smith)) and should be excluded from consideration as type.

There is a bewildering and variable array of forms, variously described as subspecies or "varieties" of *P. gracilis*, which require detailed taxonomic study. I suspect that most of these will prove to be synonyms of a single polytypic species (*P. gracilis*), but at this stage there is insufficient information about the intra- and inter-specific components of this variation. One unambiguous synonymy can be established here: the lectotype worker of *P. variabilis* (F. Smith) in BMNH agrees very closely with that of *P. gracilis*, the only substantial difference being that the *P.*

variabilis petiole is black. I have designated a lectotype of *P. variabilis* because a second worker glued to the same card (and bearing therefore the same type label as *P. variabilis*) is that of a different species – *P. maculatus* (F. Smith)! I have printed a lectotype label for *P. variabilis* and marked the card shared by the two specimens in such a way that the *P. maculatus* worker is clearly excluded as a type specimen of *P. variabilis*.

Pseudomyrmex holmgreni (Wheeler)

Pseudomyrma holmgreni Wheeler, 1925:11. Two syntype workers, Chaquimayo, Peru (N. Holmgren) (NHRS) [Examined]. One worker here designated LECTOTYPE.

Contrary to statements in the original description, this widespread South American species is not closely related to *P. filiformis*. Rather, it is a member of the *P. pallidus* group, bearing some resemblance to *P. euryblemma* (q.v.) but differing in the following worker characters: metanotal groove wider and more deeply incised; basal face of propodeum subequal in length to declivitous face (longer than the declivitous face in *P. euryblemma*); and head tending to be more elongate, with the sides rounding more gradually into the occipital margin. The workers and queens of *P. holmgreni* vary considerably in color, from concolorous orange to dark brown, including intermediate forms with variable degrees of infuscation of the body.

Pseudomyrmex laevifrons Ward, *nom. nov.*

Pseudomyrma laeviceps F. Smith, 1877:63. Two syntype workers, Para, Brazil (BMNH) [Examined]. One syntype worker here designated LECTOTYPE. [Preoccupied by *Pseudomyrma laeviceps* F. Smith, 1859 = *Tetraoponera laeviceps* (F. Smith)].

This is a small (worker HW 0.48–0.56, n=14) distinctive species with closely contiguous, anterodorsally elevated frontal carinae; a smooth, shiny, punctulate head; long eyes; and, in the workers, an unusually shaped propodeum such that the basal and declivitous faces meet at a sharp angle. The known range of *P. laevifrons* extends from Costa Rica to Bolivia and Brazil.

Pseudomyrmex malignus (Wheeler)
(Figure 41)

Pseudomyrma maligna Wheeler, 1921b:143. Syntype workers, males, queens, Kartabo, Guyana (W.M. Wheeler) (MCZC, MZSP) [Examined].

Pseudomyrma maligna var. *cholera* Wheeler, 1921b:146. Syntype workers, Kartabo, Guyana (W.M. Wheeler) (MCZC) [Examined] *Syn. nov.*

Pseudomyrma maligna var. *crucians* Wheeler, 1921b:147. Syntype workers, Kartabo, Guyana (W.M. Wheeler) (MCZC) [Examined] *Syn. nov.*

Pseudomyrma auripes Wheeler, 1922:5. Holotype queen, Trinidad, July 1920 (W.M. Wheeler) (MCZC) [Examined] *Syn. nov.*

Workers and queens of this *Tachigali*-associated ant species are distinguished from those of *P. concolor* (= *P. latinodus*) by the following features: median clypeal lobe less ventrally deflected, laterally subangulate (Fig. 41); erect pilosity sparser, lacking on sides of head above the eyes (frontal view); and anteroventral process of petiole more prominently recurved, hook-like. In addition, the queen has distinctive, basally geniculate mandibles (e.g., Wheeler, 1921b, Fig. 14). The color and size variation reflected in the "varieties" *cholericus* and *crucians* can be seen within single nest series.

See also the discussion under *P. concolor* and *P. tachigaliae* (Forel).

Pseudomyrmex osurus (Forel), *stat. reval.*

Pseudomyrma levigata [sic] subsp. *osura* Forel, 1911:279. Syntype worker, Costa Rica (Pittier) (MHNG) [Examined]. *Stat. reval.* [Incorrectly synonymized (provisionally) under *P. faber* (F. Smith) by Kempf, 1958:449].

Pseudomyrma laevigata subsp. *insularis* Enzmann, 1945:88. Holotype worker, Barro Colorado Island, Panama (location unknown) [not examined]. *Syn. nov.* [Incorrectly synonymized (provisionally) under *P. faber* (F. Smith) by Kempf, 1958:449].

Examination of the syntype worker of *P. osurus* shows this to be a distinct species, differing from *P. faber* (F. Smith) by the shape of the petiole (possessing a distinct anterior peduncle and differentiated node, in lateral view), and the smooth, shiny punctulate head. Enzmann's description of *P. insularis* fits *P. osurus* tolerably well, and agrees more closely with *P. osurus* than with any other species in the *P. laevigatus* complex known to me from Central America.

P. osurus is typically concolorous orange (head black in some Costa Rican and Colombian workers, which I take to be this species), while *P. faber* is more variable, with some workers (including the type) having a dark brown to black head and mesosoma.

Pseudomyrmex pazosi (Santschi), *stat. nov.*

Pseudomyrma pazosi Santschi, 1909:309. Syntype workers, queens, Cuba (Pazosi) (NHMB) [Examined].

One syntype worker here designated LECTOTYPE.

Pseudomyrma flavidula var. *pazosi* Santschi; Wheeler, 1913:484.

Pseudomyrma flavidula var. *jaumei* Aguayo, 1932:217. Holotype worker, El Palenque, Cuba (M. Jaume) (MCZ) [Examined] *Syn. nov.*

P. pazosi is a small (worker HW < 0.76) Cuban species in the *P. pallidus* group, with orange head, mesosoma, petiole, and postpetiole, and a contrasting black gaster; smooth, shiny punctulate head; broad fore femur; and a gaster devoid of dense pubescence. The *P. jaumei* holotype merely represents a faded, discolored *P. pazosi* worker.

Pseudomyrmex perboscii (Guérin)
(Figure 43)

Myrmex perboscii Guérin, 1844:428. Holotype queen, Baie de Campeche, Mexico (Perbose) (not in MCSN, MNHN, or ZSMC) [Not examined].

Tetraponera testacea F. Smith, 1852:45. Holotype dealate queen, [Rio] Napo, Peru (BMNH) [Examined] *Syn. nov.*

Pseudomyrma perbosci [sic] Guérin; Forel, 1899:96 [Description of worker].

Pseudomyrma simoides Forel, 1911:281. Syntype worker, Amazonas, Brazil (Bates) (MHNG) [Examined] *Syn. nov.*

Pseudomyrma icterica Wheeler, 1922:4. Holotype worker, Port of Spain, Trinidad (A. Busck) (MCZC) [Examined] *Syn. nov.*

This medium-sized species (worker HW 1.09–1.44, $n=15$) has a truncate median clypeal lobe, which is sharply rounded laterally (Fig. 43); relatively well-separated frontal carinae (MFC subequal to distal scape width) and conspicuously protruding median lobes of the antennal sclerites; a deeply incised metanotal groove (in the worker); and a somewhat shiny, orange- to testaceous-brown, integument, the gaster sometimes darker in color. The head and mesosoma have fine, punctulate sculpture, the punctulae varying in density, as do the minute, piligerous punctures (and associated appressed pubescence) on the postpetiole and gaster. Standing pilosity is fine and rather sparse (lacking on outer faces of the tibiae and on the worker mesonotum).

Having examined the types of *P. testaceus*, *P. simoides*, and *P. ictericus*, I feel fairly confident about the specific identity of these three. Moreover, they appear to be conspecific with the “*Pseudomyrma perbosci*” worker described by Forel (1899) from Costa Rica. Unfortunately, the type of *P. perboscii* could not be located, but the original description, while scanty, contains enough information to justify the above synonymy. Among the features mentioned by Guérin, the combination of the elongate, subrectangular head (nearly twice as long as wide), globose postpetiole, fawn-yellow body with dark gaster, finely shagreened to shiny appearance, and large size (9.5mm long), fits the queen of no other species known to me.

In northern Colombia and Venezuela I collected colonies of this species in live terminal branches of saman (*Pithecellobium saman*) trees. The ants occupied numerous unconnected cavities, 5–20 mm long (2–4 mm internal diameter) in which they kept brood and tended coccids. The cavities appeared to be intrinsic to the plant since unoccupied cavities, without entrance holes, could be found. Although the workers patrolled the foliage and would sting if molested, they were much less aggressive than the *Pseudomyrmex* ants inhabiting *Tachigali*, *Triplaris*, or swollen-thorn acacias. Thus the association may represent an early (or arrested?) phase in the development of an ant-plant mutualism.

Pseudomyrmex rufiventris (Forel) *stat. nov.*

Pseudomyrma kurokii var. *rufiventris* Forel, 1911:275. Syntype queen, San Bernardino, Paraguay (K. Fiebrig) (ZSMC) [Examined].

Although obviously closely related to *P. euryblemma* (= *P. kurokii*) (q.v.), *P. rufiventris* appears to be distinct enough to warrant specific status. The head of the queen and worker is covered with dense, punctulate-coriarius sculpture which renders it opaque; this may be contrasted with a weaker punctulate sculpture and subluclid appearance in *P. euryblemma*.

Pseudomyrmex rufomedius (F. Smith)

Pseudomyrma rufomedia F. Smith, 1877:66. Syntype alate queen (unique), Aceituno, Guatemala (BMNH) [Examined].

Pseudomyrma stolli Forel, 1912:20. Syntype worker, queens, male, Retalhuleu, Guatemala (Stoll)(MHNG) [Examined] *Syn. nov.*

P. rufomedius is a distinctive species, known only from Guatemala and southern Mexico, workers and queens of which possess a broad head with relatively small eyes; a flattened and laterally marginate pronotum; a more or less apendunculate petiole, much longer than high or wide, whose dorsal face is also flattened and laterally margined; very fine, pale, inconspicuous pilosity; and a bicolored body (orange petiole contrasting with dark brown head and gaster; remainder of body variably infuscated). An additional characteristic feature of the worker is the virtual obliteration of the metanotal groove, the mesonotum and propodeum forming a continuous, elevated, and laterally compressed plate.

The *P. rufomedius* type, although lacking a head, agrees closely with the worker-associated queens of *P. stolli* (and other material which I have examined), and there can be no doubt about the identity of the species (*cf.* Perrault, 1987).

Pseudomyrmex simplex (F. Smith)

In reviewing this species, as one of these occurring in the Nearctic region, I interpreted incorrectly the type locality "St. Paul" to be in the state of São Paulo, Brazil (Ward, 1985:238). In fact, "St. Paul" refers to São Paulo de Olivença, a Bates collecting locality in the Brazilian state of Amazonas (Kempf, 1972).

Pseudomyrmex spinicola (Emery)

(Figure 44)

Pseudomyrma spinicola Emery, 1890:64. Syntype workers, queens, males, Alajuela, Costa Rica (Alfaro) (MCSN) [Examined]. One worker here designated LECTOTYPE.

P. spinicola is a common species of acacia-ant, ranging from Honduras to Colombia, workers of which are distinguished from those of the more northerly species, *P. ferrugineus*, by the following traits: median clypeal lobe with a concave anterior margin and with lateral angles or teeth (Fig. 44); frontal carinae more closely contiguous and median lobes of antennal sclerites correspondingly more exposed; frons with more extensive shiny interspaces between the punctures;

propodeal spiracles more salient in dorsal view; petiole longer, with a tendency towards more pronounced posterolateral angles in dorsal view.

Most of the forms described as subspecies or varieties of *P. spinicola* are probably conspecific with it (with the exception of *P. convarians* (Forel)), but I refrain from proposing formal synonymy until the variation is better understood.

Pseudomyrmex tachigaliae (Forel) *stat. nov.*

(Figure 42)

Pseudomyrma latinoda race *tachigaliae* Forel, 1904b:686. Syntype workers, queens, males, Tarapoto, Peru (Ule) (MHNG) [Examined].

Pseudomyrma latinoda subsp. *bradleyi* Wheeler, 1942:169. Syntype workers, Perene, Peru (Bradley) (MCZC) [Examined] *Syn. nov.*

Pseudomyrma bradleyi Enzmann, 1945:82. Syntype workers, Perene, Peru (Bradley) (MCZC) [Examined] [Objective synonym of *Pseudomyrma latinoda bradleyi* Wheeler; Brown, 1949:42]

This *Tachigali*-ant is apparently confined to the western Amazon basin and adjacent foothills. The worker is recognized by the laterally angulate and inflected median clypeal lobe (Fig. 42); subcontiguous frontal carinae (MFC < basal scape width); sparse and inconspicuous pilosity; and dense appressed pubescence which is much better developed than in *P. malignus* or *P. concolor*.

Pseudomyrmex tenuis (Fabricius)

Formica tenuis Fabricius, 1804:405. Syntype worker, Essequibo, Guyana (Smidt) (ZMUC) [Examined]; here designated LECTOTYPE.

The lectotype worker of *P. tenuis* is concolorous testaceous brown, with a densely punctate, opaque head; large elongate eyes; inflected, tectiform median clypeal lobe; sharply margined pronotum; tall, thin, anterodorsally angulate (pointed) petiole; and no erect pilosity on the mesosoma dorsum. This agrees with the concept of *P. tenuis* which has been prevalent in the literature.

For a listing of synonyms see Kempf (1972), but note that *P. nigriceps* (F. Smith) is now a junior synonym of *P. termitarius* (F. Smith) (Perrault, 1987).

Pseudomyrmex triplaris (Forel)

Pseudomyrma triplaris Forel, 1904b:684. Syntype workers, queens, male, Jurua Miry, Jurua, Amazonas, Brazil (Ule) (MHNG) [Examined].

Pseudomyrma triplaris subsp. *boxi* Wheeler, 1942:184. Syntype workers, queens, males, Blairmont, Berbice, Guyana (H.E. Box) (MCZC) [Examined] *Syn. nov.* One syntype worker here designated LECTOTYPE.

The worker of this *Triplaris*-associated ant has a sublucid, densely punctate head which is distinctly broader than that of *P. viduus* (CI 0.87–0.93, n=17); frontal carinae more closely contiguous than in *P. triplarinus* or *P. dendroicus* but less so than in *P. viduus* (FCI 0.071–0.109); a median clypeal lobe which is sharply rounded laterally; and a conspicuous, recurved (hook-like) subpetiolar process.

I have designated a lectotype of *P. boxi* because the type series in the MCZC contains a few workers of *P. viduus* (q.v.). Wheeler (1942) confused these two species; the main series of *P. viduus* from Blairmont, Guyana was described by him as a second subspecies of *P. triplaris* (*P. triplaris tigrinus*).

Pseudomyrmex viduus (F. Smith)

Pseudomyrma vidua F. Smith, 1858:158. Syntype male (unique), Ega, Amazonas, Brazil (BMNH) [Examined].

Pseudomyrma caroli Forel, 1899:89. Syntype workers, queens, Nicoya, Costa Rica (M. R. Alfaro) (MCSN, MHNG) [Examined]. *Syn. nov.*

Pseudomyrma caroli var. *sapii* Forel, 1904b:688. Syntype workers, queens, Born Fim, Jurua, Amazonas, Brazil (Ule) (MHNG) [Examined]. *Syn. nov.*

Pseudomyrma ulei Forel, 1904b:689. Syntype workers, Jurua Miry, Jurua, Amazonas, Brazil (Ule) (MHNG) [Examined]. *Syn. nov.*

Pseudomyrma triplaris subsp. *baileyi* Wheeler, 1942:185. Syntype workers, queens, Camaria, Cuyuni River, Guyana (W. M. Wheeler) (MCZC) [Examined] *Syn. nov.*

Pseudomyrma triplaris subsp. *tigrina* Wheeler, 1942:186. Syntype workers, males, Blairmont, Berbice, Guyana (H. E. Box) (MCZC) [Examined] *Syn. nov.* One syntype worker here designated LECTOTYPE.

Pseudomyrma triplaris subsp. *biolleyi* Enzmann, 1945:93. Syntype workers, queens, Camaria, Cuyuni River, Guyana (W. M. Wheeler) (MCZC) [Examined] [Objective synonym of *P. triplaris baileyi* Wheeler; Brown, 1949:43].

Pseudomyrma triplaris subsp. *trigona* Enzmann, 1945:94. Syntype workers, males, Blairmont, Berbice, Guyana (N. E. Box) (MCZC) [Examined] [Objective synonym of *P. triplaris tigrina* Wheeler; Brown, 1949:43].

The type of *P. viduus* is a damaged male lacking head, postpetiole, and gaster. Nevertheless the shape of the petiole (in particular, the broad anterior peduncle; MPW = 0.22, PW13 = 0.61) and general habitus clearly place it in the cluster of species which Kempf (1961) called the *P. latinodius* group (cf. Perrault, 1987). I compared it with males of likely candidate species, namely *P. concolor* (= *P. latinodius*), *P. nigrescens*, *P. tachigaliae*, *P. malignus*, *P. caroli*, *P. triplaris*, *P. symbioticus*, *P. triplarinus*, and *P. dendroicus*. The *P. viduus* type agrees closely with males of *P. caroli* with respect to size, pilosity, mesonotal sculpture, and (especially) shape of the petiole, while disagreeing with the remaining species in petiole shape and in one or more aspects of size, pilosity, or sculpture. Specifically, *P. viduus* has a shiny punctate mesonotum, covered with both appressed pubescence and fine, golden pilosity, the latter up to 0.20 mm long; conspicuous pilosity on the legs and petiole (ca. 19 standing hairs in outline on the petiolar dorsum); an elongate petiole (PLI = 0.52); and small absolute size (PL = 0.77, PH = 0.40, DPW = 0.36, mesonotal width = 0.92). Only males of *P. caroli* agree with this combination of characters. The other names listed under the synonymy of *P. viduus* (*P. sapii*, *P. ulei*, *P. baileyi*, *P. tigrinus*, and Enzmann's copycat names) appear to represent nothing more than the normal variation of the species heretofore known as *P. caroli*. Workers and queens of this species can be recognized by their elongate heads (worker CI 0.70 – 0.80, n=22; queen CI 0.62 – 0.68, n=8) and closely adjacent frontal carinae (worker FCI 0.048 – 0.087; queen FCI 0.062 – 0.085) compared to

other members of the erstwhile *P. latinodus* group (here referred to as the *P. viduus* group).

As I presently understand it, *P. viduus* is a widespread, somewhat variable species, and a generalist occupant of ant-plants. Colonies have been collected within live branches or cavities of *Ocotea*, *Cordia*, *Sapium*, *Coussapoa*, and *Triplaris*. Detailed biological studies of *P. viduus* may reveal several cryptic species, associated with particular ant-plants, but the present material does not support any clear division(s).

Summary of Taxonomic Changes

P. concolor (F. Smith), 1860.

= *P. latinodus* (Mayr, 1877), *syn. nov.*

P. dendroicus (Forel, 1904a), *stat. reval.*

= *P. emarginatus* (Forel, 1904b), *syn. nov.*

P. ejectus (F. Smith, 1858).

= *P. lincecumii* (Buckley, 1866), *syn. nov.*

P. euryblemma (Forel, 1899).

= *P. kurokii* (Forel, 1906), *syn. nov.*

P. ferrugineus (F. Smith, 1877).

= *P. fulvescens* (Emery, 1890), *syn. nov.*

= *P. canescens* (Wasmann, 1915), *syn. nov.* (preoccupied)

= *P. wasmanni* (Wheeler, 1921a) (replacement name for *P. canescens* Wasmann).

= *P. bequaerti* (Wheeler, 1942), *syn. nov.*

= *P. saffordi* (Wheeler, 1942), *syn. nov.*

= *P. vesanus* (Wheeler, 1942), *syn. nov.*

= *P. honduranus* (Enzmann, 1945), *syn. nov.*

P. filiformis (Fabricius, 1804).

= *P. longiceps* (Forel, 1906), *syn. nov.*

= *P. longiceps* (Stitz, 1933), *syn. nov.* (preoccupied).

P. flavicornis (F. Smith, 1877).

= *P. belti* (Emery, 1890), *syn. nov.*

= *P. obnubilus* (Menozi, 1927), *syn. nov.*

= *P. fellosus* (Wheeler, 1942), *syn. nov.*

P. gracilis (Fabricius, 1804).

= *P. variabilis* (F. Smith, 1877), *syn. nov.*

P. holmgreni (Wheeler). No taxonomic changes proposed.

P. laevifrons Ward, *nom. nov.*

= *P. laeviceps* (F. Smith, 1877) (preoccupied).

P. malignus (Wheeler, 1921b).

= *P. cholericus* (Wheeler, 1921b), *syn. nov.*

- = *P. crucians* (Wheeler, 1921b), *syn. nov.*
- = *P. auripes* (Wheeler, 1922), *syn. nov.*
- P. osurus* (Forel, 1911), *stat. reval.*
- = *P. insularis* (Enzmann, 1945), *syn. nov.*
- P. pazosi* (Santschi, 1909), *stat. nov.*
- = *P. jaumei* (Aguayo, 1932), *syn. nov.*
- P. perboscai* (Guérin, 1844).
- = *P. testaceus* (F. Smith, 1852), *syn. nov.*
- = *P. simoides* (Forel, 1911), *syn. nov.*
- = *P. ictericus* (Wheeler, 1922), *syn. nov.*
- P. rufiventris* (Forel, 1911), *stat. nov.*
- P. rufomedius* (F. Smith, 1877).
- = *P. stollii* (Forel, 1912), *syn. nov.*
- P. simplex* (F. Smith). No taxonomic changes proposed.
- P. spinicola* (Emery). No taxonomic changes proposed.
- P. tachigaliae* (Forel, 1904b), *stat. nov.*
- = *P. bradleyi* (Wheeler, 1942), *syn. nov.*
- P. tenuis* (Fabricius). No taxonomic changes proposed.
- P. triplariidis* (Forel, 1904b).
- = *P. boxi* (Wheeler, 1942), *syn. nov.*
- P. viduus* (F. Smith, 1858).
- = *P. caroli* (Forel, 1899), *syn. nov.*
- = *P. sapii* (Forel, 1904b), *syn. nov.*
- = *P. ulei* (Forel, 1904b), *syn. nov.*
- = *P. baileyi* (Wheeler, 1942), *syn. nov.*
- = *P. tigrinus* (Wheeler, 1942), *syn. nov.*

CONCLUDING REMARKS

The taxonomic findings presented in this paper illustrate two recurring patterns in the genus *Pseudomyrmex*: the occurrence of closely related (sibling) species with broadly overlapping geographical ranges and, at the same time (if my interpretation of synonymy is correct), the existence of considerable geographical variation within many species.

There are relatively few allopatric pairs of sister species in the genus (*P. curacaensis* and *P. cretus* are one possible example). *Pseudomyrmex* queens of all species are fully winged and capable of dispersal; such vagility may be responsible for the relative rapidity with which recently speciated forms come into secondary contact (assuming that initial differentiation occurred in allopatry). Moreover, *Pseudomyrmex* species which are generalist nesters in dead twigs – and this is true of the majority of species – are remarkably tolerant of other congeners in the same habitat, with the result that allospecific colonies often share the same foraging space.

For example, thirteen species of *Pseudomyrmex* were observed foraging on the fig tree and adjacent vegetation, where the type specimens of *Pseudomyrmex spiculus* were collected.

Such close habitation is not typical of those *Pseudomyrmex* species which live in plant domatia. Colonies of these species seldom overlap in foraging space; yet there may be several species in a given locality. In the Tarapoto region of northern Peru, *Triplaris* plants are occupied by four related species in the *P. viduus* group; similar numbers of species co-occur on swollen thorn *Acacia* in parts of Central America. com.

com. The discrimination and identification of *Pseudomyrmex* species, which is generally feasible for sympatric collections, is made more difficult on a large geographical scale by the considerable variation which occurs within many taxa. This is hardly a novel situation – examples of polytypy are common in ants (Ward, 1989) – but the situation is aggravated in some *Pseudomyrmex* where the discriminatory value of characters varies from one region to another. Thus in Costa Rica, workers of *P. elongatus* and *P. caeciliae* are consistently separable on head sculpture, but in Guatemala and southern Mexico one encounters some individuals exhibiting intermediate conditions of this character. In western Mexico, where there appears to be a single taxon, which I take to be *P. elongatus*, individuals also tend to be shifted towards an intermediate condition. Similar situations occur in other species complexes. Whether the taxa concerned are truly discrete (but their identities obscured by character shifts in allopatry) or are in fact reproductively isolated in some regions but not others, cannot be determined without further population-level studies.

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NOTE ADDED IN PROOF

Further study of Central American acacia-ants (*P. ferrugineus* group) permits recognition of the following species:

Pseudomyrmex peper (Forel).

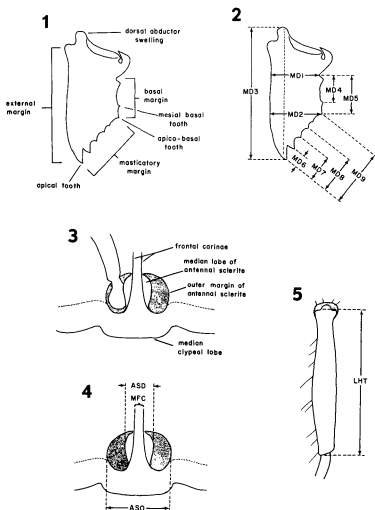
Pseudomyrma peper Forel, 1913:213. Syntype workers, Patulul, Guatemala (Peper) (MHNG) [Examined].

Pseudomyrma spinicola race *convarians* Forel, 1913:214. Syntype worker, Patulul, Guatemala (Peper) (MHNG) [Examined] *Syn. nov.*

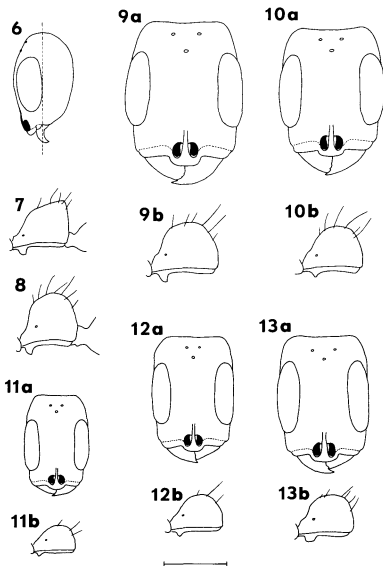
Pseudomyrma sabanica [sic] var. *saffirdi* Enzmann, 1945:89. Syntype workers, Yerba Santa, Chiapas, Mexico (G.N. Collins) (MCZC) [Examined] *Syn. nov.* [Incorrectly synonymized under *P. belti saffordi* (Wheeler) by Brown, 1949:42].

An obligate acacia-ant, distributed from southern Mexico to Nicaragua, *P. peper* can be recognized by the following features in workers and queens: relatively small size (worker HW < 0.92, queen HW < 0.86); light to medium brown (not black)

coloration; densely punctulate, opaque head (presenting a matte appearance); and broad petiolar node with salient posterolateral angles.



Figures 1-5. Illustrations of some measurements and morphological terms used for pseudomyrmecine ants (see also Figures 1-4 in Ward, 1985). Figs. 1, 2. *Pseudomyrmex* worker, right mandible: terminology and associated measurements. Figs. 3, 4. *Pseudomyrmex* worker, fronto-clypeal complex: terminology and associated measurements; right antenna (Fig. 3) and both antennae (Fig. 4) removed. Fig. 5. *Pseudomyrmex* worker, lateral view of left hind tibia, illustrating the measurement LHT.



Figures 6-13. Various views of workers in the *Pseudomyrmex oculatus* group. Fig. 6. *P. elongatus*, lateral view of worker head, antennae removed, showing the plane of view utilized for a full-face, frontal (dorsal) view of head. Fig. 7. Lateral view of worker petiole, *P. oculatus* (Brazil). Fig. 8. Same, *P. schuppi* (Brazil). Figs. 9-13. Paired illustrations of head (frontal view) without antennae or pilosity and petiole (lateral view) of: *P. cretus*, holotype worker, Costa Rica (9a, 9b); *P. curacaensis*, worker, Colombia (10a, 10b); *P. pisinnus*, holotype worker, Brazil (11a, 11b); *P. urbanus*, worker, Brazil (12a, 12b); and *P. alustratus*, holotype worker, Peru (13a, 13b). All drawn to same scale; scale line = 0.5 mm.

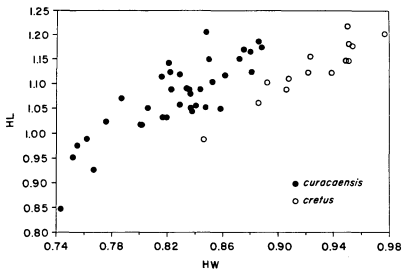


Figure 26. Scattergram of HL by HW, for workers of *Pseudomyrmex curacaensis* and *P. cretus*.

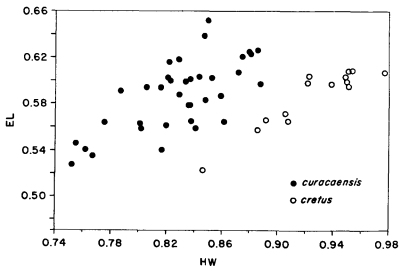


Figure 27. Scattergram of EL by HW, for workers of *P. curacaensis* and *P. cretus*.

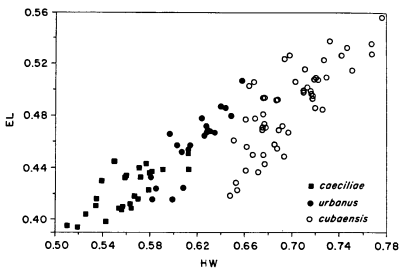


Figure 28. Scattergram of EL by HW, for workers of *P. caeciliae*, *P. urbanus*, and *P. cubaensis*.

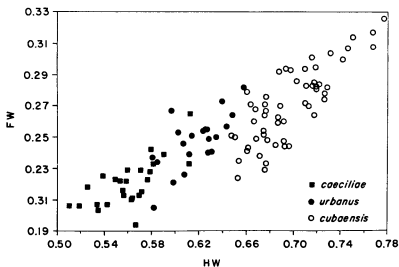


Figure 29. Scattergram of FW by HW, for workers of *P. caeciliae*, *P. urbanus* and *P. cubaensis*.

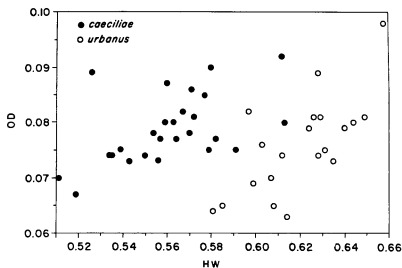


Figure 30. Scattergram of OD by HW, for workers of *P. caeciliae* and *P. urbanus*. The two largest *P. caeciliae* workers come from Jamaica and are rather atypical.

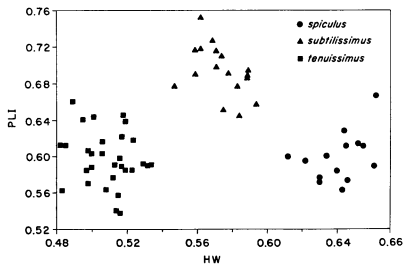
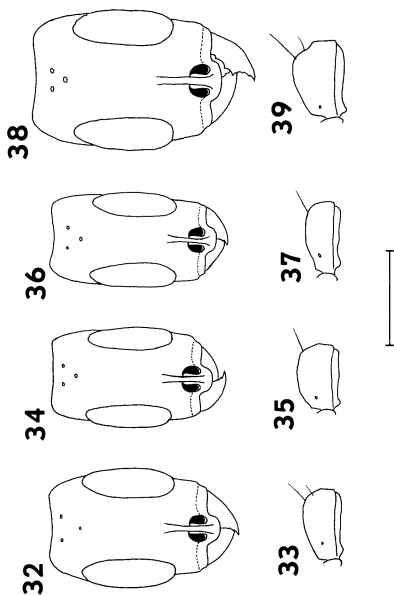


Figure 31. Scattergram of PLI (= PH/PL) by HW, for workers of *P. spiculus*, *P. subtilissimus*, and *P. tenuissimus*.



Figures 32–39. Paired illustrations of the head (frontal view) without antennae and petiole (lateral view) of workers in the *Pseudomyrmex subillissimus* group: *P. spicatus*, holotype worker, Costa Rica (32, 33); *P. subillissimus*, worker, Costa Rica (34, 35); *P. tenuissimus*, worker, Venezuela (36, 37); *P. villosus*, holotype worker, Brazil (38, 39). All drawings to same scale; scale line = 0.5 mm.

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